TABLE OF CONTENTS

Page

8.3 Water Use Environmental Effects 8.3-1
8.3.1 Hydrology 8.3-1
8.3.1.1 Bypass and Peaking Reaches 8.3-2
8.3.1.2 Reservoirs 8.3-3
8.3.1.3 Powerhouses 8.3-4
8.3.2 Beneficial Uses or Existing Water Rights 8.3-4
8.3.2.1 Beneficial Uses 8.3-4
8.3.2.2 Existing Water Rights 8.3-5
8.3.3 Existing Operating Agreements or Contracts 8.3-5
8.3.4 Consumptive Water Deliveries or Power Generation 8.3-6
8.3.4.1 Consumptive Water Deliveries 8.3-6
8.3.4.2 Power Generation 8.3-6
8.3.5 Stream and Reservoir Gaging Stations 8.3-6
8.3.6 Conclusions – Water Use 8.3-6
8.3.7 Unavoidable Adverse Effects 8.3-7

List of Tables

Table 8.3-1a. Hydrology Data Summary for Selected Locations in the Large Bypass and Peaking Reaches.

Table 8.3-1b. Hydrology Data Summary for Selected Locations in the Small Bypass Reaches.

Table 8.3-2a. Hydrology Statistics for the Proposed Action as a Percentage of the No-Action Alternative for Selected Locations in the Large Bypass and Peaking.

Table 8.3-2b. Hydrology Statistics for the Proposed Action as a Percentage of the No-Action Alternative for Selected Locations in the Small Bypass Reaches.

Table 8.3-3. Hydrology Data Summary for MFP Reservoirs.

Table 8.3-4. Hydrology Statistics for the Proposed Action as a Percentage of the No-Action Alternative for MFP Reservoirs.

Table 8.3-5. Middle Fork Project Hydrology Data Summary for MFP Powerhouses.

List of Figures

Figure 8.3-1. Graphs of Monthly Exceedance Curves (20%, 50%, and 80%) for Selected Locations in the Large Bypass and Peaking Reaches.

Figure 8.3-2. Graphs of Monthly Exceedance Curves (20%, 50%, and 80%) for Selected Locations in the Small Bypass Reaches.

Figure 8.3-3. Graphs of Monthly Exceedance Curves (20%, 50%, and 80%) for MFP Reservoirs.

Figure 8.3-4. Graphs of Monthly Exceedance Curves (20%, 50%, and 80%) for MFP Powerhouses.

8.3 WATER USE ENVIRONMENTAL EFFECTS

This section describes potential impacts to water use under the Proposed Action for the Middle Fork American River Project (MFP or Project). Section 4.0 – Proposed Action (including Tables 4-4, 4-5, and 4-6) provides a description of routine operation and maintenance activities to be implemented under the Proposed Action compared to the No-Action Alternative. Appendix A – Modified or New Facilities Construction Activities and Concept Designs includes a description of facility modification and construction activities to be implemented under the Proposed Action.

Potential impacts to water use have been identified based on changes in routine operations and maintenance activities, implementation of non-routine recreation facility activities, and modification of existing and construction of new facilities. Impacts to water use under the Proposed Action are evaluated relative to changes in MFP operations affecting:

- Hydrology in bypass and peaking reaches and reservoirs;
- Beneficial uses or existing water rights;
- Existing operating agreements or contracts;
- Consumptive water deliveries (existing or future) or power generation; and
- Stream and reservoir gaging stations.

A description of potential impacts to water use resulting from implementation of the Proposed Action is provided below. Unavoidable adverse effects are also discussed at the end of this section.

8.3.1 Hydrology

The Proposed Action results in modifications to Project operations associated with the new instream flow measures, new reservoir minimum pool requirements, Hell Hole Reservoir Seasonal Storage Increase Improvement, and small diversion dam modifications (Section 4.0 – Proposed Action). In general, the Proposed Action provides higher instream flows compared to the No-Action Alternative (Instream Flow and Reservoir Minimum Pool Measure [IFRM] PCWA 2011a; Supporting Document [SD] A). Reservoir elevations are similar under both alternatives. Flows through the powerhouses are slightly lower (average annual generation loss of 4.59%) from implementation of the new instream flow measures (Section 9.0 – Cumulative Effects Analysis and Section 11.0 – Economic Analysis). The potential effects of changes in MFP operations on hydrology in the bypass and peaking reaches and reservoir storage are described in the following sections.

8.3.1.1 Bypass and Peaking Reaches

Hydrology data under the Proposed Action and No-Action Alternative are summarized in Tables 8.3-1a–b, including the average, minimum, and maximum flow and 20%, 50%, and 80% exceedance flows by month from 1975–2007 for selected locations in the bypass and peaking reaches. Monthly exceedance plots (20%, 50%, and 80%) for each of these locations are provided in Figures 8.3-1 and 8.3-2. Comparisons of these flow statistics under the Proposed Action and No-Action Alternative are provided in Tables 8.3-2a–b (Section 8.1 – Analytical Approach). A summary of the effects of the Proposed Action on hydrology (50% exceedance flow) in the bypass and peaking reaches is summarized below.

- Large Bypass Reaches
    - In the Rubicon River, the 50% exceedance flow under the Proposed Action is equal to or higher than the No-Action Alternative throughout the year at all locations. The largest differences in the 50% exceedance flow occur: (1) immediately downstream of Hell Hole Dam during December through June (Proposed Action 50% exceedance flow is 50 to 193% higher) and (2) in the lower reach in May (Proposed Action 50% exceedance flow is 76 to 97% higher) (Table 8.3-2a).
    - In the Middle Fork American River immediately below French Meadows Dam, the 50% exceedance flow under the Proposed Action is higher than under the No-Action Alternative throughout the year (13 to 65% higher) (Table 8.3-2a). At the bottom of the reach (between the confluence of Duncan Creek and Middle Fork Interbay), the 50% exceedance flow under the Proposed Action is higher than the No-Action Alternative, except during December through April. The flows during this time are slightly higher under the No-Action Alternative (2–15% higher; 0.7-25 cubic feet per second [cfs]). The reason for these differences in December through April is a modeling artifact. Under the No-Action Alternative, inflow into this reach from Duncan Creek is based on impaired historical hydrology where the Duncan Creek diversions are curtailed periodically due to debris problems at the intake (Section 3.0 – No-Action Alternative and Section 8.1 – Analytical Approach). Under the Proposed Action, inflows from Duncan Creek are based on modeling results where the Duncan Creek Diversion diverts up to the allowable limit in the new instream measures and existing water rights conditions (100% diversion efficiency).
    - In the Middle Fork American River below Middle Fork Interbay, the 50% exceedance flow under the Proposed Action is higher than under the No-Action Alternative throughout the year at most locations (Table 8.3-2a). Differences between the alternatives are most pronounced in May and June when 50% exceedance flows under the Proposed Action are 42 to 96% higher than the No-Action Alternative. The one exception occurs in February

at the bottom of the reach when 50% exceedance flow is slightly higher under the No-Action Alternative (3% higher, 2.5 cfs).

- Peaking Reach
    - In the peaking reach, 50% exceedances flows are similar (within approximately 15%) in all months and locations between the Proposed Action and the No-Action Alternative except for October and November (Table 8.3-2a). Under the Proposed Action, the 50% exceedance flows at all locations are lower in October (19-20%) and higher in November (67–70%) compared to the No-Action Alternative. These differences are primarily due to differences in maintenance outages (length and timing) and differences in power generation (historical generation versus current power generation demand curve) between the modeled Proposed Action modeling assumptions and historical hydrology in the No-Action Alternative.
- Small Bypass Reaches
    - In the small bypass streams, the 50% exceedance flows under the Proposed Action are similar to No-Action Alternative – Existing License Conditions, with a few notable exceptions (Table 8.2-2b). In the spring (March–May), the 50% exceedance flows are higher to substantially higher (up to 267% higher) under the Proposed Action in Duncan Creek, North Fork Long Canyon Creek, and South Fork Long Canyon Creek. Conversely, in Duncan Creek and South Fork Long Canyon Creek, flows in December are slightly higher (16–22%) under the No-Action Alternative. However, this difference is due to a change in water year type designation in two years between the No-Action Alternative and Proposed Action. The No-Action Alternative established flows based on two water-year type designations with winter flows based on the April forecast. The Proposed Action established flows based on five water-year type designations with winter flows based on an end of year forecast (typically in October). Although flows in the Proposed Action are higher in all water year types, in two years (1988 and 1993) the water year type designation that establishes winter flows changed between the Proposed Action and No-Action Alternative due to difference in the forecast months. This resulted in higher December flows under the No-Action Alternative.

8.3.1.2 Reservoirs

Monthly reservoir storage from 1975–2007 under the Proposed Action and No-Action Alternative are summarized in Table 8.3-3, including the average, minimum, and maximum storage and 20%, 50%, and 80% storage exceedance by month from 1975–2007. Monthly exceedance plots (20%, 50%, and 80%) for each reservoir are provided in Figure 8.3-3. Overall, monthly reservoir storage (50% exceedance) in Hell Hole Reservoir under the Proposed Action – Future Demand is slightly higher (1–7% greater) than under the No-Action Alternative – Existing License Conditions (Table 8.3-4 and Figure 8.3-3). In French Meadows Reservoir, monthly reservoir storage (50%

exceedance) is slightly lower (3–17%) under the Proposed Action compared to the No-Action Alternative – Existing License Condition. In both reservoirs, these relatively small differences are a result of new instream flow measures, new reservoir minimum pool requirements, build out, increased consumptive demand (including Water Forum Agreement flows), the Hell Hole Reservoir Seasonal Storage Increase Improvement, and modeling assumptions. The Proposed Action – Future Demand is modeled with a slightly different assumed water balance between the two reservoirs due to changes to the minimum pool requirements than the No-Action Alternative – Existing License Conditions.

8.3.1.3 Powerhouses

Flow data for French Meadows, Middle Fork, Ralston, and Oxbow powerhouses under the Proposed Action and No-Action Alternative are summarized in Table 8.3-5, including the average, minimum, and maximum flow and 20%, 50%, and 80% exceedance storage by month from 1975–2007. Monthly exceedance plots (20%, 50%, and 80%) for each powerhouse are provided in Figure 8.3-4. Overall, the 50% exceedance flow through the powerhouses under the Proposed Action are slightly lower compared to the No-Action Alternative due to implementation of the new instream flow measures. Compared to the No-Action Alternative, the timing of generation is shifted under the Proposed Action at French Meadows, Middle Fork, and Ralston powerhouses. Generation is higher in the early winter (November–December) (50% exceedance) and lower in late winter/early spring (February–April). These differences are primarily due to differences in power generation timing between the Proposed Action and the No-Action Alternative. The No-Action Alternative model run has historical generation built in, whereas the Proposed Action model run utilizes an idealized power demand curve based on 2005 data. At Oxbow Powerhouse, the 50% exceedance flows are similar under the Proposed Action and No-Action Alternative, with the exception of November where the Proposed Action is higher and October where the Proposed Action is lower. These differences are mainly due to differences between the Proposed Action and the No-Action Alternative in maintenance outages (historical length/timing versus modeled Proposed Action length/timing) and changes in power generation (historical generation versus power generation demand curve).

8.3.2 Beneficial Uses or Existing Water Rights

The Proposed Action includes modifications to Project operations that could affect beneficial uses or existing water rights. These potential effects are described below.

8.3.2.1 Beneficial Uses

The MFP is located in the Central Valley Region – Regional Water Quality Control Board. Existing and potential beneficial uses that apply to surface waters within the Middle Fork American River Watershed are identified in *The Sacramento River Basin and San Joaquin River Basin Water Quality Control Plan (Basin Plan) for the California Regional Water Quality Control Board – Control Valley Region (Fourth Edition revised February 2007)*. Beneficial uses identified in the Basin Plan that pertain to the MFP

include: (1) municipal and domestic supply; (2) agricultural supply; (3) hydropower generation; (4) water contact recreation; (5) non-contact water recreation; (6) cold freshwater habitat; (7) warm freshwater habitat; (8) spawning, reproduction, and/or early development habitat for fisheries; and (9) wildlife habitat.

The Proposed Action protects overall beneficial uses in the vicinity of the MFP. Environmental programs, measures, and facilities included under the Proposed Action were specifically developed to protect municipal, domestic, and agricultural water supply and to enhance water contact recreation; non-contact water recreation; cold freshwater fish habitat; spawning, reproduction and/or early development habitat for fisheries; and wildlife habitat (Figure 4-2). Implementation of the Proposed Action results in reduced power generation (average annual loss of approximately 4.59%). This loss of generation is the result of higher instream releases designed to enhance aquatic, geomorphology, riparian, wildlife, and recreational resources in the vicinity of the MFP. These enhancements provide greater overall benefits to resources and are protective of beneficial uses.

8.3.2.2 Existing Water Rights

Operations of MFP under the Proposed Action are consistent with existing water rights permits and license issued by the State Water Resources Control Board (State Water Board) for the MFP (Section 3.5.2 – No-Action Alternative). The Hell Hole Reservoir Seasonal Storage Increase Improvement requires a new water right from the State Water Board to allow for additional storage for power generation (non-consumptive use) at Hell Hole Reservoir. Placer County Water Agency (PCWA) will file a request for a new water right with the State Water Board for additional water stored and used for generation associated with the Hell Hole Reservoir Seasonal Storage Increase. The Hell Hole Reservoir Seasonal Storage Increase Improvement will not be constructed until the new water right is issued. Therefore, the Proposed Acton is consistent with existing water rights.

8.3.3 Existing Operating Agreements or Contracts

Operating agreements/contracts affecting Project operations identified in Section 3.5.2 – No-Action Alternative (i.e., water supply contracts and the Water Forum Agreement) will remain unchanged under the Proposed Action. The one exception, unrelated to the Proposed Action, is that the existing power purchase contract for the MFP expires on April 30, 2013. PCWA is currently negotiating a new power purchase contract, which will be in place prior to the expiration of the current Pacific Gas & Electric (PG&E) contract. This power purchase contract will be consistent with the new Federal Energy Regulatory Commission (FERC or Commission) license conditions, water rights, and existing operating agreements/contracts and will not result in additional limitations or constraints in Project operations. Therefore, the Proposed Acton does not conflict with any existing operating agreements or contracts.

8.3.4 Consumptive Water Deliveries or Power Generation

Changes in operations resulting from implementation of the Proposed Action have the potential to affect consumptive water deliveries and power generation. The potential effects of each of these are discussed below.

8.3.4.1 Consumptive Water Deliveries

PCWA provides water for consumptive use from the MFP (Section 3.5.3). Current water demand from the MFP is approximately 42,000 acre-feet (ac-ft). However, during the term of the next license, PCWA expects to utilize its full allocation of 120,000 ac-ft of water available annually from the MFP to meet increasing consumptive water demands. Under the Proposed Action, operations of the MFP allow delivery of consumptive water (timing and magnitude) consistent with existing and future demand. Therefore, the Proposed Action protects PCWA's current and future consumptive water supply.

8.3.4.2 Power Generation

Under the Proposed Action, the Project will produce an annual average of approximately 991,384 megawatt-hours (MWh) of electricity. This represents a 4.59% reduction (47,694 MWh) in Project generation compared to the No-Action Alternative. This loss of generation is the result of higher instream releases designed to enhance environmental resources.

8.3.5 Stream and Reservoir Gaging Stations

The Proposed Action includes 14 new flow gages to measure instream flow conditions and/or collect real-time flow data for public dissemination in specified bypass and peaking reaches and water surface elevations in Hell Hole and French Meadows reservoirs. The locations and gages are described in Section 4.0 – Proposed Action, Table 4.3, and the Flow and Reservoir Monitoring Plan (FRMP) (PCWA 2011b; SD B). These new gages under the Proposed Action increase instream flow and reservoir storage monitoring capabilities.

8.3.6 Conclusions – Water Use

Changes in MFP operations under the Proposed Action maintain current and future water use, as follows:

- Maintains MFP hydrology;
- Protects existing beneficial uses and existing water rights;
- Consistent with current operating agreements and contracts;

- Protects PCWA's current and future consumptive water supply;
- Reduces power generation only slightly to provide environmental benefits; and
- Increases instream flow and reservoir storage monitoring capabilities.

8.3.7 Unavoidable Adverse Effects

There are no unavoidable adverse effects to water use under the Proposed Action.

LITERATURE CITED

Placer County Water Agency (PCWA). 2011a. Instream Flow and Reservoir Minimum Pool Measure. Available in PCWA's Application for New License – Supporting Document A.

____. 2011b. Flow and Reservoir Monitoring Plan. Available in PCWA's Application for New License – Supporting Document A.

Regional Water Quality Control Board (CVRWQCB). 2004. The Sacramento River Basin and San Joaquin River Basin Water Quality Control Plan (Basin Plan) for the California Regional Water Quality Control Board – Central Valley Region (Fourth Edition revised September 2007).

TABLES

Table 8.3-1a. Hydrololgy Data Summary for Selected Locations in the Large Bypass and Peaking Reaches.

Site and Hydrology Node Analysis	Exceedances and Summary Statistics	Flow (cfs) 1975 - 2007											
		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Large Bypass Streams													
Rubicon River - Below Hell Hole Reservoir (540.832)													
Proposed Action - Existing Demand	20%	33.1	27.0	27.0	27.0	27.0	57.0	62.0	200.0	90.0	32.0	32.0	32.0
	50%	27.0	27.0	27.0	27.0	27.0	37.0	44.0	44.0	33.0	22.0	22.0	22.0
	80%	22.0	22.0	22.0	22.0	22.0	22.0	37.0	37.0	22.0	22.0	22.0	22.0
	Average	28.1	23.6	46.8	66.6	30.1	47.5	51.0	167.8	110.2	49.8	25.9	26.2
	Max	61.3	44.9	3,961.7	23,316.7	1,196.3	5,409.7	472.3	5,225.8	1,995.0	1,236.2	32.0	51.7
	Min	16.0	16.0	16.0	16.0	16.0	16.0	32.0	24.0	16.0	16.0	16.0	16.0
No-Action Alternative - Impaired Hydrology	20%	30.6	23.0	22.0	17.0	20.0	21.0	21.0	25.0	25.0	23.0	23.0	23.0
	50%	22.0	22.0	15.0	13.0	14.0	15.0	15.0	21.0	22.0	22.0	22.0	22.0
	80%	10.0	14.0	12.0	12.0	12.0	12.0	13.0	14.0	20.0	18.0	11.0	11.0
	Average	23.8	19.6	25.9	65.0	20.9	30.5	20.7	105.0	107.4	43.3	18.6	21.1
	Max	69.0	55.0	4,350.0	17,100.0	1,190.0	6,650.0	557.0	8,720.0	1,950.0	1,350.0	31.0	66.0
	Min	4.3	6.5	5.6	5.9	6.1	5.9	7.7	7.7	0.3	6.5	6.5	5.9
Rubicon River - Below South Fork Rubicon River (834.836)													
Proposed Action - Existing Demand	20%	55.4	50.2	76.3	143.3	194.5	248.8	244.6	329.8	169.8	65.2	57.1	55.0
	50%	47.4	42.3	48.7	67.3	92.1	142.9	139.4	145.2	74.5	49.8	45.7	44.9
	80%	33.6	34.6	40.3	44.0	52.3	84.7	80.6	64.0	40.2	33.2	31.4	31.1
	Average	47.8	61.7	139.1	208.2	191.0	202.9	181.1	271.6	161.9	74.6	44.4	43.9
	Max	577.8	3,327.5	9,353.1	35,322.5	11,194.5	9,387.6	2,666.3	8,699.9	2,295.1	1,508.8	73.2	209.2
	Min	19.7	20.0	21.9	25.3	25.0	24.9	37.4	30.8	20.6	18.0	17.8	17.9
No-Action Alternative - Impaired Hydrology	20%	52.0	45.0	71.5	147.2	187.8	225.4	203.5	186.9	85.7	55.4	47.2	47.2
	50%	43.7	38.5	41.0	57.5	83.9	120.8	107.0	73.8	58.3	43.2	37.7	39.0
	80%	28.6	31.8	30.7	31.0	42.0	68.1	55.9	46.2	39.1	33.1	28.7	26.9
	Average	43.5	57.7	118.3	206.6	181.8	185.9	150.7	208.8	159.0	68.1	37.1	38.8
	Max	570.8	3,354.5	9,413.1	27,559.9	11,308.5	10,627.9	2,662.3	12,194.1	2,349.8	1,512.7	63.2	188.2
	Min	9.2	10.8	13.0	15.4	15.1	15.2	13.3	14.8	12.2	8.8	8.3	8.3
Rubicon River - Above Ralston Afterbay (842.815+815ACC)													
Proposed Action - Existing Demand	20%	86.0	99.1	212.8	537.7	770.8	945.8	882.0	833.3	319.1	121.2	88.6	78.9
	50%	70.8	70.0	107.1	198.4	294.8	466.1	439.3	342.8	139.6	81.0	64.5	59.5
	80%	42.1	51.0	69.7	78.0	126.8	226.3	198.1	127.7	68.4	47.1	39.7	39.5
	Average	69.6	115.2	358.0	534.8	664.4	675.6	619.7	562.3	262.9	114.3	65.5	60.7
	Max	993.6	5,073.1	26,067.5	47,438.6	35,186.2	13,272.4	7,974.5	9,965.8	2,710.5	1,729.6	143.2	310.0
	Min	23.5	22.9	28.9	34.9	32.9	40.7	46.1	46.8	25.4	19.1	18.4	18.6
No-Action Alternative - Impaired Hydrology	20%	78.0	93.2	220.1	567.4	777.1	934.1	822.2	716.4	234.1	111.3	78.3	72.2
	50%	65.5	67.1	97.4	193.6	290.0	447.0	392.5	195.0	122.5	75.0	56.0	54.3
	80%	42.0	49.7	58.9	64.9	115.0	204.8	160.0	104.1	65.0	47.0	39.2	37.0
	Average	65.6	115.3	345.3	543.6	669.8	666.0	588.3	489.1	260.5	107.5	58.2	55.6
	Max	1,060.0	5,400.1	26,427.4	40,451.5	35,600.2	14,812.7	8,270.5	13,459.0	3,230.1	1,790.1	131.2	289.0
	Min	11.0	14.0	20.0	25.0	23.0	31.0	22.0	28.3	17.0	9.9	8.9	9.0

Table 8.3-1a. Hydrololgy Data Summary for Selected Locations in the Large Bypass and Peaking Reaches (continued).

Site and Hydrology Node Analysis	Exceedances and Summary Statistics	Flow (cfs) 1975 - 2007											
		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Large Bypass Streams (continued)													
Middle Fork American River - Below French Meadows Reservoir (530.802)													
Proposed Action - Existing Demand	20%	16.5	15.0	15.0	15.0	15.0	17.5	22.0	190.0	18.5	15.0	15.0	15.0
	50%	15.0	13.0	13.0	13.0	13.0	13.5	15.0	15.0	13.5	12.0	12.0	13.0
	80%	12.0	11.0	11.0	11.0	11.0	12.0	15.0	15.0	13.0	11.0	11.0	11.0
	Average	14.6	12.5	13.6	18.5	15.6	23.3	17.9	94.9	55.6	20.7	12.6	12.8
	Max	24.2	15.0	359.1	4,555.1	1,249.3	4,429.7	22.0	1,267.8	1,144.1	809.6	15.0	25.4
	Min	9.0	9.0	9.0	9.0	9.0	9.0	12.0	12.0	9.0	9.0	9.0	9.0
No-Action Alternative - Impaired Hydrology	20%	9.9	10.0	11.0	13.0	14.0	15.6	14.0	17.0	12.0	10.0	10.0	9.9
	50%	9.1	9.5	9.8	10.0	10.0	12.0	11.0	9.9	9.7	9.5	9.2	9.3
	80%	7.7	7.7	8.2	8.7	8.6	9.5	9.3	8.5	7.7	7.6	7.7	7.7
	Average	9.1	9.4	11.2	20.2	19.5	23.8	17.7	61.6	36.3	15.1	8.6	9.8
	Max	75.0	71.0	164.0	3,280.0	993.0	2,380.0	531.0	3,430.0	690.0	521.0	11.0	152.0
	Min	2.7	2.8	2.8	4.1	4.4	4.1	3.9	2.7	3.1	2.8	2.7	2.6
Middle Fork American River - Above Middle Fork Interbay (806.810+810ACC)													
Proposed Action - Existing Demand	20%	28.0	46.0	93.3	181.8	214.0	283.1	265.2	448.7	90.5	49.0	30.0	26.6
	50%	25.5	26.7	41.0	78.0	114.0	165.5	160.6	124.8	55.5	30.9	23.3	21.7
	80%	24.0	20.8	26.1	30.5	49.9	94.5	93.7	60.4	32.1	19.2	16.3	15.4
	Average	26.5	44.4	93.9	142.7	168.8	212.0	191.3	251.4	105.3	44.1	24.0	22.1
	Max	389.0	754.0	2,459.0	6,844.6	4,394.0	5,879.7	946.0	1,735.0	1,320.1	863.6	62.2	97.0
	Min	12.4	12.0	15.2	16.9	17.5	22.0	28.7	28.5	16.9	13.0	11.2	11.6
No-Action Alternative - Impaired Hydrology	20%	25.5	45.6	108.8	222.8	260.5	331.2	297.4	342.4	101.7	47.4	27.5	23.0
	50%	19.6	24.1	41.7	91.1	133.5	190.5	172.0	104.0	52.0	29.7	20.7	19.3
	80%	15.1	18.6	24.3	28.2	51.6	105.9	93.3	53.7	30.4	19.2	14.9	13.6
	Average	23.1	49.2	110.3	175.3	208.9	246.7	215.5	216.8	98.3	40.2	21.7	20.1
	Max	604.6	1,071.1	2,985.4	7,801.0	5,238.7	3,231.7	1,169.0	3,604.5	953.9	575.7	53.8	117.7
	Min	7.6	8.6	13.1	10.0	15.5	18.8	18.5	18.7	12.3	7.5	6.1	5.8
Middle Fork American River - Below Middle Fork Interbay (810.812)													
Proposed Action - Existing Demand	20%	27.3	25.5	25.5	25.5	25.5	159.5	65.0	360.3	75.0	34.0	34.0	34.0
	50%	25.5	25.5	25.5	25.5	25.5	25.5	40.0	40.0	47.0	24.0	24.0	24.0
	80%	24.0	24.0	24.0	24.0	24.0	25.0	27.0	27.0	24.0	18.0	18.0	18.0
	Average	25.8	23.2	49.0	84.6	83.1	114.7	95.6	195.4	91.3	37.1	25.0	25.0
	Max	214.0	603.3	2,873.5	7,764.6	4,773.2	5,895.7	1,174.8	2,600.0	1,336.1	869.1	58.2	70.6
	Min	12.0	12.0	12.0	12.0	12.0	12.0	18.0	18.0	12.0	12.0	12.0	12.0
No-Action Alternative - Impaired Hydrology	20%	24.0	24.0	25.0	26.8	34.9	124.7	136.4	94.8	64.1	24.0	24.0	24.0
	50%	20.0	23.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	23.0	20.0
	80%	15.0	18.0	19.0	19.0	23.0	23.0	23.0	23.0	21.0	20.0	15.0	15.0
	Average	20.4	24.5	62.5	92.8	127.8	118.0	98.0	124.8	76.1	30.7	20.4	20.1
	Max	180.2	601.6	2,885.9	7,616.1	4,993.0	3,261.7	1,373.1	3,931.4	881.1	615.2	48.0	119.0
	Min	4.8	6.3	8.5	6.9	11.0	11.0	11.0	7.6	7.8	5.7	5.5	5.5

Table 8.3-1a. Hydrololgy Data Summary for Selected Locations in the Large Bypass and Peaking Reaches (continued).

Site and Hydrology Node Analysis	Exceedances and Summary Statistics	Flow (cfs) 1975 - 2007											
		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Large Bypass Streams (continued)													
Middle Fork American River - Above Ralston Afterbay (813.845)													
Proposed Action - Existing Demand	20%	55.8	61.6	80.8	140.5	201.1	281.3	203.5	458.0	115.2	57.0	47.7	45.1
	50%	37.5	39.6	47.4	52.9	87.4	121.0	104.6	112.2	66.8	40.4	35.7	35.0
	80%	28.8	28.6	31.9	37.5	42.8	71.1	47.8	47.6	33.6	24.1	21.7	21.5
	Average	45.4	58.0	117.6	163.3	197.5	214.7	188.2	255.7	120.0	52.5	35.0	34.1
	Max	409.7	1,500.8	6,240.8	11,101.3	10,189.9	6,155.2	2,545.3	3,032.5	1,400.4	903.9	74.9	133.6
	Min	16.1	14.4	12.1	12.2	18.7	27.2	19.5	21.5	17.2	13.0	12.6	12.7
No-Action Alternative - Impaired Hydrology	20%	51.1	61.8	88.4	142.9	203.0	281.5	237.2	177.3	104.8	47.1	38.6	35.5
	50%	35.3	38.1	45.3	51.7	89.8	106.3	87.8	74.2	47.0	37.0	31.3	29.5
	80%	22.7	28.4	36.3	36.7	42.4	68.1	42.3	43.7	33.9	27.0	19.9	18.9
	Average	40.1	59.3	131.2	171.5	242.2	218.1	190.6	185.1	104.8	46.1	30.5	29.2
	Max	375.8	1,764.6	6,253.2	10,952.8	10,409.8	3,521.2	2,656.6	4,144.6	924.9	644.4	72.5	131.5
	Min	8.7	8.7	12.1	13.2	17.7	22.7	12.5	14.5	13.0	6.7	6.2	6.4
Peaking Reach													
Middle Fork American River - Below Ralston Afterbay (855.857)													
Proposed Action - Existing Demand	20%	174.2	1,126.5	1,292.8	2,070.1	2,302.6	2,879.4	2,548.0	2,722.1	1,510.9	1,082.2	1,026.6	865.3
	50%	150.0	973.1	709.2	663.6	1,046.1	1,621.1	1,396.0	1,369.7	832.3	827.8	770.6	467.6
	80%	91.0	495.7	264.3	200.0	319.6	616.5	501.3	321.7	430.2	502.7	462.9	296.0
	Average	200.5	939.2	1,227.8	1,525.1	1,794.8	1,957.2	1,752.3	1,670.8	1,097.8	855.6	745.5	549.9
	Max	2,070.8	12,895.4	47,708.4	72,081.7	62,447.2	27,786.5	17,575.3	15,274.2	4,955.0	3,840.2	1,251.7	1,755.2
	Min	75.0	75.0	94.1	94.2	94.0	115.0	111.9	113.5	88.3	129.9	125.0	75.0
No-Action Alternative - Impaired Hydrology	20%	742.0	843.2	1,220.0	1,966.0	2,378.0	2,780.0	2,282.0	2,160.0	1,390.0	1,000.0	983.6	830.2
	50%	187.0	572.0	613.0	777.0	1,200.0	1,560.0	1,350.0	1,190.0	798.0	741.0	746.0	600.0
	80%	94.0	187.8	209.0	287.0	450.4	635.4	466.6	324.0	430.6	480.8	487.8	244.4
	Average	389.4	676.9	1,137.9	1,532.3	1,852.7	1,900.6	1,620.7	1,481.1	1,021.3	758.0	711.6	572.2
	Max	2,910.0	15,500.0	35,700.0	64,500.0	46,400.0	23,200.0	19,500.0	23,500.0	4,430.0	3,640.0	1,230.0	1,260.0
	Min	41.0	51.0	54.0	75.0	79.0	79.0	69.0	76.0	50.0	64.0	65.0	65.0
Middle Fork American River - Above Otter Creek (860.863)													
Proposed Action - Existing Demand	20%	181.4	1,137.4	1,308.9	2,097.8	2,337.3	2,920.5	2,584.5	2,770.3	1,540.2	1,090.9	1,033.9	871.6
	50%	156.1	978.9	717.2	676.4	1,068.8	1,648.8	1,428.1	1,405.8	844.2	836.3	776.8	474.0
	80%	96.3	501.5	271.1	208.3	329.9	632.2	522.0	338.9	437.6	510.0	469.1	301.2
	Average	207.6	950.9	1,248.0	1,550.3	1,824.9	1,990.2	1,786.8	1,708.5	1,119.6	865.5	752.1	556.1
	Max	2,157.4	13,189.4	48,511.8	73,103.1	63,481.7	28,146.8	17,897.7	15,515.7	5,027.3	3,902.0	1,267.3	1,773.5
	Min	79.9	80.0	99.6	99.7	99.6	121.9	120.0	121.8	94.5	134.8	129.8	80.4

Table 8.3-1a. Hydrololgy Data Summary for Selected Locations in the Large Bypass and Peaking Reaches (continued).

Site and Hydrology Node Analysis	Exceedances and Summary Statistics	Flow (cfs) 1975 - 2007											
		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Peaking Reach (continued)													
Middle Fork American River - Above Otter Creek (860.863)													
No-Action Alternative - Impaired Hydrology	20%	749.5	850.7	1,231.5	1,996.9	2,406.1	2,823.7	2,326.6	2,202.5	1,418.6	1,015.5	990.4	837.6
	50%	194.0	581.0	622.5	790.6	1,215.1	1,589.7	1,380.3	1,218.5	811.7	747.4	752.9	605.6
	80%	100.2	196.0	217.5	295.2	460.9	653.3	490.3	342.8	439.6	486.5	493.5	249.6
	Average	396.4	688.5	1,158.1	1,557.5	1,882.8	1,933.6	1,655.2	1,518.8	1,043.0	767.8	718.1	578.4
	Max	2,996.6	15,794.0	36,242.7	65,335.7	47,434.6	23,560.3	19,822.3	23,741.4	4,503.3	3,697.9	1,245.0	1,270.5
	Min	46.9	56.1	59.6	81.5	84.7	85.9	77.4	84.3	59.7	69.3	70.4	70.6
Middle Fork American River - Above North Fork American River Confluence (866.868)													
Proposed Action - Existing Demand	20%	191.8	1151.6	1328.1	2134.2	2384.7	2979.4	2645.9	2835.6	1590.6	1106.0	1044.2	880.5
	50%	165.1	989.1	728.7	696.1	1098.1	1692.0	1474.5	1447.7	865.6	848.2	785.2	483.3
	80%	104.3	510.2	280.9	219.4	344.7	651.9	553.5	362.8	450.5	520.4	480.3	309.0
	Average	217.6	967.3	1276.2	1585.7	1866.5	2036.8	1836.0	1763.7	1151.6	879.9	761.6	565.2
	Max	2282.1	13594.1	49610.5	74526.8	64856.6	28685.9	18332.3	15883.4	5135.1	3995.0	1290.4	1799.1
	Min	87.3	87.6	107.8	107.9	107.8	131.7	132.2	134.3	103.7	142.2	137.1	88.4
No-Action Alternative - Impaired Hydrology	20%	758.8	862.5	1247.1	2030.0	2446.8	2879.7	2375.7	2256.6	1464.4	1033.2	999.8	847.5
	50%	202.8	593.3	636.4	811.7	1239.2	1627.3	1430.9	1273.1	836.3	758.8	761.8	614.5
	80%	108.9	208.9	228.8	307.8	475.3	675.1	524.7	370.1	452.2	495.0	502.6	257.5
	Average	406.4	704.9	1186.3	1592.9	1924.4	1980.1	1704.4	1574.0	1075.1	782.2	727.7	587.5
	Max	3121.3	16198.7	37036.2	66484.9	48809.5	24099.4	20257.0	24101.3	4613.1	3785.0	1267.3	1285.4
	Min	55.5	63.7	67.8	89.8	93.2	95.6	90.1	96.7	74.1	77.2	78.4	78.8

Table 8.3-1b. Hydrology Data Summary for Selected Locations in the Small Bypass Reaches.

Site and Hydrology Node Analysis	Exceedances and Summary Statistics	Flow (cfs) 1975 - 2007											
		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Duncan Creek - Top of Reach (804.805)													
Proposed Action - Existing Demand	20%	2.3	10.0	10.0	10.0	10.0	18.0	26.0	80.6	14.0	7.4	2.0	1.3
	50%	1.0	3.1	6.2	10.0	10.0	13.0	19.0	19.0	10.5	2.6	1.0	0.8
	80%	0.6	1.3	3.7	4.9	5.0	10.0	16.0	16.0	5.0	1.2	0.5	0.5
	Average	1.8	5.4	13.6	14.7	15.1	17.5	21.2	48.8	9.7	5.5	1.6	1.2
	Max	10.0	484.0	1,530.0	2,400.0	1,830.0	1,180.0	251.0	720.0	26.0	26.0	24.0	26.0
	Min	0.1	0.3	0.7	0.8	1.4	3.4	5.5	3.6	1.2	0.1	0.1	0.2
No-Action Alternative - Impaired Hydrology	20%	2.2	7.5	14.0	16.0	16.0	18.0	17.0	20.0	12.0	6.3	1.9	1.3
	50%	1.0	2.6	7.2	11.0	12.0	14.0	13.0	11.0	8.7	2.6	1.0	0.8
	80%	0.6	1.3	3.4	4.6	6.0	11.0	9.3	8.4	4.4	1.2	0.5	0.5
	Average	2.1	8.2	19.7	24.9	25.2	20.0	16.4	29.3	14.6	4.2	1.4	1.1
	Max	196.0	674.0	1,730.0	2,560.0	2,020.0	1,070.0	651.0	834.0	252.0	105.0	9.2	12.0
	Min	0.1	0.3	0.7	0.8	0.9	3.0	4.1	3.4	1.2	0.1	0.1	0.1
No-Action Alternative - Existing License Conditions	20%	2.3	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	7.4	2.0	1.3
	50%	1.0	3.1	7.9	10.0	10.0	10.0	10.0	10.0	10.0	2.6	1.0	0.8
	80%	0.6	1.3	3.7	4.9	5.4	10.0	10.0	10.0	5.0	1.2	0.5	0.5
	Average	1.8	5.4	13.0	13.6	14.1	11.2	9.7	12.1	8.0	4.0	1.5	1.2
	Max	10.0	484.0	1,530.0	2,400.0	1,830.0	780.0	251.0	547.0	26.0	10.0	10.0	10.0
	Min	0.1	0.3	0.7	0.8	1.4	3.4	5.0	3.6	1.2	0.1	0.1	0.2
Duncan Creek - Bottom of Reach (805.806)													
Proposed Action - Existing Demand		7.5	19.8	42.2	80.8	94.8	127.8	123.5	141.2	36.5	20.0	8.2	6.0
	50%	4.7	7.8	17.4	34.2	50.4	75.4	75.5	57.0	24.1	9.6	5.1	4.2
	80%	2.9	4.7	8.0	10.2	20.7	42.7	44.6	29.2	11.8	4.9	3.0	2.4
	Average	6.3	17.3	43.5	63.8	77.1	94.3	89.5	97.1	27.7	13.6	6.0	4.8
	Max	180.1	598.4	1,941.0	2,785.2	2,975.1	1,301.1	428.9	1,085.7	157.6	76.7	34.4	51.1
	Min	0.6	0.9	2.6	3.7	3.7	7.7	10.8	8.0	4.1	1.4	0.4	0.6
No-Action Alternative - Impaired Hydrology	20%	7.2	18.4	44.7	88.9	103.6	127.1	115.6	121.4	37.2	17.9	8.0	6.0
	50%	4.6	7.5	17.0	38.1	53.5	75.9	68.0	41.1	21.8	9.6	5.1	4.2
	80%	2.9	4.7	8.0	10.2	20.7	42.9	38.3	22.0	10.9	4.8	3.0	2.4
	Average	6.6	20.0	49.6	74.0	87.2	96.8	84.7	77.6	32.5	12.2	5.8	4.7
	Max	307.1	788.4	2,141.0	3,185.2	3,165.1	1,191.1	717.4	1,086.7	272.3	117.6	19.2	37.1
	Min	0.6	0.9	2.6	3.6	3.7	7.3	8.1	8.0	4.1	1.4	0.4	0.5
No-Action Alternative - Existing License Conditions	20%	7.5	19.8	42.3	80.9	94.8	120.3	108.3	93.8	33.8	19.2	8.2	6.0
	50%	4.7	7.8	17.7	35.2	50.8	71.7	64.7	38.7	22.0	9.6	5.1	4.2
	80%	2.9	4.7	8.0	10.2	20.7	41.8	36.5	22.2	11.0	4.9	3.0	2.4
	Average	6.3	17.3	42.9	62.7	76.1	88.0	78.0	60.4	25.9	12.0	5.9	4.8
	Max	180.1	598.4	1,941.0	2,785.2	2,975.1	901.1	412.9	885.7	153.6	60.7	21.1	35.3
	Min	0.6	0.9	2.6	3.7	3.7	7.7	8.3	8.0	4.1	1.4	0.4	0.6

Table 8.3-1b. Hydrology Data Summary for Selected Locations in the Small Bypass Reaches (continued).

Site and Hydrology Node Analysis	Exceedances and Summary Statistics	Flow (cfs) 1975 - 2007											
		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
North Fork Long Canyon Creek - Top of Reach (817.819)													
Proposed Action - Existing Demand	20%	0.5	3.0	3.0	3.0	3.0	8.0	12.5	12.5	6.0	1.4	0.5	0.4
	50%	0.3	0.8	3.0	3.0	3.0	7.0	11.0	10.3	2.3	0.7	0.3	0.3
	80%	0.2	0.4	1.0	1.4	3.0	3.0	8.7	4.1	0.9	0.4	0.2	0.1
	Average	0.4	1.5	5.6	6.3	5.4	7.0	10.8	12.0	3.1	1.1	0.4	0.3
	Max	9.0	84.1	665.5	692.3	472.3	142.8	116.8	162.7	7.0	12.5	2.1	5.2
	Min	0.0	0.1	0.0	0.3	0.3	0.7	0.6	0.9	0.2	0.1	0.0	0.0
No-Action Alternative - Impaired Hydrology	20%	0.5	2.2	5.9	8.5	8.7	10.5	5.6	5.5	3.9	1.4	0.5	0.4
	50%	0.3	0.8	2.4	3.1	3.5	3.5	3.1	3.2	2.1	0.7	0.3	0.3
	80%	0.2	0.4	1.0	1.4	2.0	2.6	2.0	2.0	0.9	0.4	0.2	0.1
	Average	0.5	3.1	8.8	10.6	10.7	9.1	8.7	8.0	3.1	1.1	0.4	0.3
	Max	29.9	184.1	765.5	692.3	572.3	242.8	216.8	212.7	30.8	13.4	2.0	5.2
	Min	0.0	0.1	0.0	0.3	0.3	0.7	0.6	0.9	0.2	0.1	0.0	0.0
No-Action Alternative - Existing License Conditions	20%	0.5	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	1.4	0.5	0.4
	50%	0.3	0.8	3.0	3.0	3.0	3.0	3.0	3.0	2.3	0.7	0.3	0.3
	80%	0.2	0.4	1.0	1.4	3.0	3.0	3.0	3.0	0.9	0.4	0.2	0.1
	Average	0.4	1.5	4.1	5.0	4.8	3.3	3.2	3.0	2.0	1.0	0.4	0.3
	Max	9.3	84.1	665.5	592.3	472.3	142.8	116.8	112.7	3.0	3.0	2.1	3.0
	Min	0.0	0.1	0.0	0.3	0.3	0.7	0.6	0.9	0.2	0.1	0.0	0.0
South Fork Long Canyon Creek - Top of Reach (820.822)													
Proposed Action - Existing Demand	20%	0.9	4.9	6.0	6.0	6.0	10.5	15.0	15.0	8.0	2.4	1.0	0.7
	50%	0.6	1.4	3.7	6.0	6.0	9.5	13.0	13.0	5.1	1.2	0.6	0.5
	80%	0.3	0.7	1.7	2.3	3.5	6.0	13.0	9.1	1.9	0.7	0.3	0.2
	Average	0.7	2.5	9.7	11.1	9.3	9.9	13.9	19.9	4.9	2.1	0.7	0.5
	Max	6.5	123.2	1,144.2	1,215.6	805.0	226.4	180.7	273.5	8.0	15.0	6.0	9.1
	Min	0.1	0.1	0.4	0.5	0.6	1.3	1.0	1.5	0.3	0.1	0.0	0.0
No-Action Alternative - Impaired Hydrology	20%	0.9	5.0	8.7	11.2	13.2	13.2	6.7	6.7	5.9	2.4	1.0	0.7
	50%	0.6	1.4	4.9	5.3	6.1	6.3	5.9	5.9	5.0	1.2	0.6	0.5
	80%	0.3	0.7	1.7	2.3	4.1	5.0	5.0	5.0	1.9	0.7	0.3	0.2
	Average	0.9	5.0	14.7	17.2	18.6	15.2	14.9	13.6	5.3	1.9	0.7	0.5
	Max	52.5	323.2	1,344.2	1,215.6	1,005.0	426.4	380.7	373.5	54.1	23.6	5.0	9.1
	Min	0.1	0.1	0.4	0.5	0.6	1.3	1.0	1.5	0.3	0.1	0.0	0.0
No-Action Alternative - Existing License Conditions	20%	0.9	4.9	6.0	6.0	6.0	6.0	6.0	6.0	6.0	2.4	1.0	0.7
	50%	0.6	1.4	4.4	6.0	6.0	6.0	6.0	6.0	5.1	1.2	0.6	0.5
	80%	0.3	0.7	1.7	2.3	3.7	6.0	6.0	6.0	1.9	0.7	0.3	0.2
	Average	0.8	2.5	6.9	8.6	8.5	6.2	6.0	5.8	4.2	1.8	0.7	0.5
	Max	16.4	123.2	1,144.2	1,015.6	805.0	226.4	180.7	173.5	6.0	6.0	6.0	6.0
	Min	0.1	0.1	0.4	0.5	0.6	1.3	1.0	1.5	0.3	0.1	0.0	0.0

Table 8.3-1b. Hydrology Data Summary for Selected Locations in the Small Bypass Reaches (continued).

Site and Hydrology Node Analysis	Exceedances and Summary Statistics	Flow (cfs) 1975 - 2007											
		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Long Canyon Creek - Top of Reach (825.828)													
Proposed Action - Existing Demand	20%	2.3	10.9	24.4	42.4	49.5	63.1	77.0	81.7	18.0	6.3	2.5	1.8
	50%	1.5	3.6	12.9	17.8	20.0	34.2	42.7	33.0	10.3	3.2	1.6	1.2
	80%	0.8	1.8	4.5	6.1	10.6	18.9	26.2	18.7	4.9	1.8	0.8	0.6
	Average	2.1	9.9	36.2	49.5	47.3	53.5	58.4	56.3	13.1	4.9	1.7	1.3
	Max	64.5	549.0	3,231.0	3,193.2	2,340.0	831.6	700.0	831.1	83.0	52.5	7.3	24.0
	Min	0.2	0.5	1.1	1.2	1.6	3.3	2.7	4.0	0.8	0.3	0.1	0.1
No-Action Alternative - Impaired Hydrology	20%	2.3	11.9	31.5	59.3	64.0	78.0	70.0	61.1	15.0	6.3	2.5	1.8
	50%	1.5	3.5	12.4	20.0	23.0	30.0	29.0	19.6	9.3	3.2	1.6	1.2
	80%	0.8	1.8	4.4	6.1	10.0	16.0	14.5	11.0	4.5	1.8	0.8	0.6
	Average	2.3	14.0	44.3	59.9	61.9	60.9	57.3	45.9	13.5	4.6	1.7	1.3
	Max	138.0	849.0	3,531.0	3,193.2	2,640.0	1,120.0	1,000.0	981.1	142.0	62.0	6.9	24.0
	Min	0.2	0.5	1.1	1.2	1.6	3.3	2.7	3.6	0.8	0.3	0.1	0.1
No-Action Alternative - Existing License Conditions	20%	2.3	10.9	24.4	41.2	49.7	56.0	58.8	51.3	14.7	6.3	2.5	1.8
	50%	1.5	3.6	12.9	18.7	20.0	28.5	27.0	19.3	9.0	3.2	1.6	1.2
	80%	0.8	1.8	4.5	6.1	10.6	15.9	14.6	10.9	4.7	1.8	0.8	0.6
	Average	2.1	9.9	31.9	45.7	46.0	46.1	42.9	33.1	11.3	4.5	1.7	1.3
	Max	64.5	549.0	3,231.0	2,893.2	2,340.0	831.6	700.0	681.1	77.0	34.0	7.3	18.7
	Min	0.2	0.5	1.1	1.2	1.6	3.3	2.7	4.0	0.8	0.3	0.1	0.1
Long Canyon Creek - Bottom of Reach (830.842)													
Proposed Action - Existing Demand	20%	10.3	24.1	65.4	153.2	199.9	249.4	243.8	201.0	58.3	22.4	11.7	8.5
	50%	7.0	11.2	27.4	58.7	79.4	121.4	118.7	71.5	30.1	12.4	6.9	5.3
	80%	3.0	6.9	11.8	15.1	33.2	64.3	58.1	34.4	12.2	5.5	2.6	2.1
	Average	8.2	24.0	93.1	131.2	173.4	178.4	171.4	127.6	41.8	16.1	7.6	5.8
	Max	187.6	951.4	7,247.0	5,002.2	8,672.1	2,471.6	2,057.5	1,888.7	331.9	202.8	26.3	54.1
	Min	0.3	1.3	2.8	3.1	3.6	8.0	4.7	8.8	2.3	0.3	0.1	0.2
No-Action Alternative - Impaired Hydrology	20%	10.3	24.5	71.8	166.9	221.0	262.1	231.9	183.0	57.4	21.6	11.7	8.5
	50%	7.0	11.2	27.6	62.5	81.0	118.6	105.6	58.5	28.4	12.4	6.9	5.3
	80%	3.0	6.9	11.7	15.1	33.3	60.8	44.7	28.8	12.2	5.5	2.6	2.1
	Average	8.4	28.1	101.3	141.6	188.0	185.9	170.3	117.3	42.3	15.9	7.6	5.8
	Max	261.0	1,251.4	7,547.0	5,002.2	8,972.1	2,771.6	2,357.5	2,038.7	386.8	207.6	25.3	54.1
	Min	0.3	1.3	2.8	3.1	3.6	8.0	4.7	6.9	2.3	0.3	0.1	0.2
No-Action Alternative - Existing License Conditions	20%	10.3	24.1	65.7	147.7	200.3	238.5	224.6	167.5	55.6	21.6	11.7	8.5
	50%	7.0	11.2	27.4	59.1	79.4	114.4	102.9	56.6	28.7	12.4	6.9	5.3
	80%	3.0	6.9	11.8	15.1	34.1	60.6	45.4	29.0	12.2	5.5	2.6	2.1
	Average	8.2	24.0	88.9	127.3	172.0	171.1	155.8	104.4	40.1	15.7	7.6	5.8
	Max	187.6	951.4	7,247.0	4,702.2	8,672.1	2,471.6	2,057.5	1,738.7	325.9	185.6	26.3	48.8
	Min	0.3	1.3	2.8	3.1	3.6	8.0	4.7	7.9	2.3	0.3	0.1	0.2

Table 8.3-2a. Hydrology Statistics for the Proposed Action as a Percentage of the No-Action Alternative for Selected Locations in the Large Bypass and Peaking Reaches.

Site and Hydrology Node Analysis	Exceedances and Summary Statistics	Flow (cfs) 1975 - 2007											
		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Large Bypass Streams													
Rubicon River - Below Hell Hole Reservoir (540.832)													
	20%	108%	117%	123%	159%	135%	271%	295%	800%	360%	139%	139%	139%
	50%	123%	123%	180%	208%	193%	247%	293%	210%	150%	100%	100%	100%
No-Action Alternative - Impaired	80%	220%	157%	183%	183%	183%	183%	285%	264%	110%	122%	200%	200%
Hydrology	Average	118%	121%	181%	102%	144%	156%	247%	160%	103%	115%	139%	124%
	Max	89%	82%	91%	136%	101%	81%	85%	60%	102%	92%	103%	78%
	Min	372%	246%	286%	271%	262%	271%	416%	312%	4706%	246%	246%	271%
Rubicon River - Below South Fork Rubicon River (834.836)													
	20%	107%	111%	107%	97%	104%	110%	120%	176%	198%	118%	121%	117%
	50%	108%	110%	119%	117%	110%	118%	130%	197%	128%	115%	121%	115%
No-Action Alternative - Impaired	80%	118%	109%	131%	142%	125%	124%	144%	138%	103%	101%	109%	116%
Hydrology	Average	110%	107%	118%	101%	105%	109%	120%	130%	102%	110%	120%	113%
	Max	101%	99%	99%	128%	99%	88%	100%	71%	98%	100%	116%	111%
	Min	214%	185%	168%	164%	165%	164%	282%	208%	169%	204%	215%	216%
Rubicon River - Above Ralston Afterbay (842.815+815ACC)													
	20%	110%	106%	97%	95%	99%	101%	107%	116%	136%	109%	113%	109%
	50%	108%	104%	110%	102%	102%	104%	112%	176%	114%	108%	115%	110%
No-Action Alternative - Impaired	80%	100%	103%	118%	120%	110%	111%	124%	123%	105%	100%	101%	107%
Hydrology	Average	106%	100%	104%	98%	99%	101%	105%	115%	101%	106%	113%	109%
	Max	94%	94%	99%	117%	99%	90%	96%	74%	84%	97%	109%	107%
	Min	214%	164%	144%	140%	143%	131%	210%	165%	149%	193%	207%	206%
Middle Fork American River - Below French Meadows Reservoir (530.802)													
	20%	167%	150%	136%	115%	107%	112%	157%	1118%	154%	150%	150%	152%
	50%	165%	137%	133%	130%	130%	113%	136%	152%	139%	126%	130%	140%
No-Action Alternative - Impaired	80%	156%	143%	134%	126%	128%	126%	161%	176%	169%	145%	143%	143%
Hydrology	Average	160%	133%	122%	92%	80%	98%	101%	154%	153%	137%	147%	130%
	Max	32%	21%	219%	139%	126%	186%	4%	37%	166%	155%	136%	17%
	Min	333%	321%	321%	220%	205%	220%	308%	444%	290%	321%	333%	346%
Middle Fork American River - Above Middle Fork Interbay (806.810+810ACC)													
	20%	110%	101%	86%	82%	82%	85%	89%	131%	89%	103%	109%	116%
	50%	130%	111%	98%	86%	85%	87%	93%	120%	107%	104%	113%	112%
No-Action Alternative - Impaired	80%	159%	112%	107%	108%	97%	89%	100%	112%	106%	100%	109%	113%
Hydrology	Average	114%	90%	85%	81%	81%	86%	89%	116%	107%	110%	111%	110%
	Max	64%	70%	82%	88%	84%	182%	81%	48%	138%	150%	116%	82%
	Min	164%	140%	116%	169%	113%	117%	155%	152%	138%	172%	182%	201%

Table 8.3-2a. Hydrology Statistics for the Proposed Action as a Percentage of the No-Action Alternative for Selected Locations in the Large Bypass and Peaking Reaches (continued).

Site and Hydrology Node Analysis	Exceedances and Summary Statistics	Flow (cfs) 1975 - 2007											
		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Large Bypass Streams (continued)													
Middle Fork American River - Below Middle Fork Interbay (810.812)													
	20%	114%	106%	102%	95%	73%	128%	48%	380%	117%	142%	142%	142%
	50%	128%	111%	106%	106%	106%	106%	167%	167%	196%	100%	104%	120%
No-Action Alternative - Impaired	80%	160%	133%	126%	126%	104%	109%	117%	117%	114%	90%	120%	120%
Hydrology	Average	126%	95%	78%	91%	65%	97%	98%	157%	120%	121%	122%	124%
	Max	119%	100%	100%	102%	96%	181%	86%	66%	152%	141%	121%	59%
	Min	250%	190%	141%	175%	109%	109%	164%	237%	154%	211%	218%	218%
Middle Fork American River - Above Ralston Afterbay (813.845)													
	20%	109%	100%	91%	98%	99%	100%	86%	258%	110%	121%	124%	127%
	50%	106%	104%	105%	103%	97%	114%	119%	151%	142%	109%	114%	119%
No-Action Alternative - Impaired	80%	127%	101%	88%	102%	101%	104%	113%	109%	99%	89%	109%	114%
Hydrology	Average	113%	98%	90%	95%	82%	98%	99%	138%	114%	114%	115%	117%
	Max	109%	85%	100%	101%	98%	175%	96%	73%	151%	140%	103%	102%
	Min	185%	165%	100%	92%	106%	120%	156%	148%	132%	194%	202%	198%
Peaking Reach													
Middle Fork American River - Below Ralston Afterbay (855.857)													
	20%	23%	134%	106%	105%	97%	104%	112%	126%	109%	108%	104%	104%
	50%	80%	170%	116%	85%	87%	104%	103%	115%	104%	112%	103%	78%
No-Action Alternative - Impaired	80%	97%	264%	126%	70%	71%	97%	107%	99%	100%	105%	95%	121%
Hydrology	Average	52%	139%	108%	100%	97%	103%	108%	113%	107%	113%	105%	96%
	Max	71%	83%	134%	112%	135%	120%	90%	65%	112%	106%	102%	139%
	Min	183%	147%	174%	126%	119%	146%	162%	149%	177%	203%	192%	115%
Middle Fork American River - Above Otter Creek (860.863)													
	20%	24%	134%	106%	105%	97%	103%	111%	126%	109%	107%	104%	104%
	50%	80%	168%	115%	86%	88%	104%	103%	115%	104%	112%	103%	78%
No-Action Alternative - Impaired	80%	96%	256%	125%	71%	72%	97%	106%	99%	100%	105%	95%	121%
Hydrology	Average	52%	138%	108%	100%	97%	103%	108%	112%	107%	113%	105%	96%
	Max	72%	84%	134%	112%	134%	119%	90%	65%	112%	106%	102%	140%
	Min	170%	143%	167%	122%	118%	142%	155%	145%	158%	194%	184%	114%
Middle Fork American River - Above North Fork American River Confluence (866.868)													
	20%	25%	134%	106%	105%	97%	103%	111%	126%	109%	107%	104%	104%
	50%	81%	167%	115%	86%	89%	104%	103%	114%	103%	112%	103%	79%
No-Action Alternative - Impaired	80%	96%	244%	123%	71%	73%	97%	105%	98%	100%	105%	96%	120%
Hydrology	Average	54%	137%	108%	100%	97%	103%	108%	112%	107%	112%	105%	96%
	Max	73%	84%	134%	112%	133%	119%	90%	66%	111%	106%	102%	140%
	Min	157%	138%	159%	120%	116%	138%	147%	139%	140%	184%	175%	112%

Table 8.3-2b. Hydrology Statistics for the Proposed Action as a Percentage of the No-Action Alternative for Selected Locations in the Small Bypass Reaches.

Site and Hydrology Node Analysis	Exceedances and Summary Statistics	Flow (cfs) 1975 - 2007											
		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Duncan Creek - Top of Reach (804.805)													
No-Action Alternative - Impaired Hydrology	20%	105%	133%	71%	63%	63%	100%	153%	403%	117%	117%	105%	100%
	50%	102%	119%	86%[1]	91%	83%	93%	146%	173%	121%	100%	102%	103%
	80%	101%	100%	109%	107%	83%	91%	172%	190%	113%	100%	102%	103%
	Average	86%	66%	69%	59%	60%	88%	129%	167%	67%	133%	116%	107%
	Max	5%	72%	88%	94%	91%	110%	39%	86%	10%	25%	261%	217%
	Min	100%	100%	107%	100%	163%	113%	134%	106%	100%	100%	100%	170%
No-Action Alternative - Existing License Conditions	20%	100%	100%	100%	100%	100%	180%	260%	806%	140%	100%	100%	100%
	50%	100%	100%	78%[1]	100%	100%	130%	190%	190%	105%	100%	100%	100%
	80%	100%	100%	100%	100%	93%	100%	160%	160%	100%	100%	100%	100%
	Average	100%	100%	105%	108%	107%	156%	218%	405%	122%	140%	105%	102%
	Max	100%	100%	100%	100%	100%	151%	100%	132%	100%	260%	240%	260%
	Min	100%	100%	100%	100%	100%	100%	110%	100%	100%	100%	100%	100%
Duncan Creek - Bottom of Reach (805.806)													
No-Action Alternative - Impaired Hydrology	20%	103%	108%	94%	91%	92%	101%	107%	116%	98%	112%	102%	100%
	50%	101%	104%	102%	90%	94%	99%	111%	139%	110%	101%	100%	100%
	80%	100%	101%	101%	100%	100%	99%	117%	133%	108%	100%	100%	101%
	Average	96%	86%	88%	86%	88%	97%	106%	125%	85%	111%	104%	102%
	Max	59%	76%	91%	87%	94%	109%	60%	100%	58%	65%	179%	138%
	Min	100%	100%	100%	103%	100%	105%	134%	100%	100%	100%	108%	116%
No-Action Alternative - Existing License Conditions	20%	100%	100%	100%	100%	100%	106%	114%	151%	108%	104%	100%	100%
	50%	100%	99%	98%	97%	99%	105%	117%	147%	109%	100%	100%	100%
	80%	100%	100%	100%	100%	100%	102%	122%	131%	107%	100%	100%	100%
	Average	100%	100%	101%	102%	101%	107%	115%	161%	107%	113%	101%	101%
	Max	100%	100%	100%	100%	100%	144%	104%	123%	103%	126%	163%	145%
	Min	100%	100%	100%	100%	100%	100%	130%	100%	100%	100%	100%	100%
North Fork Long Canyon Creek - Top of Reach (817.819)													
No-Action Alternative - Impaired Hydrology	20%	100%	138%	51%	35%	34%	76%	223%	226%	154%	100%	100%	100%
	50%	100%	100%	125%	97%	87%	200%	355%	319%	105%	100%	100%	100%
	80%	100%	100%	100%	100%	150%	115%	435%	200%	100%	100%	100%	100%
	Average	84%	47%	64%	60%	50%	77%	123%	150%	98%	100%	100%	101%
	Max	30%	46%	87%	100%	83%	59%	54%	76%	23%	93%	105%	100%
	Min	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
No-Action Alternative - Existing License Conditions	20%	100%	100%	100%	100%	100%	267%	417%	417%	200%	100%	100%	100%
	50%	100%	100%	100%	100%	100%	233%	367%	343%	100%	100%	100%	100%
	80%	100%	100%	100%	100%	100%	100%	290%	136%	100%	100%	100%	100%
	Average	99%	100%	137%	128%	111%	212%	340%	399%	151%	110%	100%	101%
	Max	97%	100%	100%	117%	100%	100%	100%	144%	233%	417%	100%	173%
	Min	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

Table 8.3-2b. Hydrology Statistics for the Proposed Action as a Percentage of the No-Action Alternative for Selected Locations in the Small Bypass Reaches (continued).

Site and Hydrology Node Analysis	Exceedances and Summary Statistics	Flow (cfs) 1975 - 2007											
		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
South Fork Long Canyon Creek - Top of Reach (820.822)													
No-Action Alternative - Impaired Hydrology	20%	100%	98%	69%	54%	45%	80%	224%	224%	136%	100%	100%	100%
	50%	100%	100%	74%[1]	114%	98%	151%	220%	220%	102%	100%	100%	100%
	80%	100%	100%	100%	100%	86%	120%	260%	182%	100%	100%	100%	100%
	Average	82%	50%	66%	64%	50%	65%	93%	146%	93%	112%	100%	100%
	Max	12%	38%	85%	100%	80%	53%	47%	73%	15%	64%	120%	100%
	Min	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
No-Action Alternative - Existing License Conditions	20%	100%	100%	100%	100%	100%	175%	250%	250%	133%	100%	100%	100%
	50%	100%	100%	84%[1]	100%	100%	158%	217%	217%	100%	100%	100%	100%
	80%	100%	100%	100%	100%	94%	100%	217%	152%	100%	100%	100%	100%
	Average	98%	100%	139%	129%	109%	159%	233%	345%	118%	116%	100%	101%
	Max	40%	100%	100%	120%	100%	100%	100%	158%	133%	250%	100%	152%
	Min	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Long Canyon Creek - Top of Reach (825.828)													
No-Action Alternative - Impaired Hydrology	20%	100%	91%	77%	72%	77%	81%	110%	134%	120%	100%	100%	100%
	50%	100%	103%	104%	89%	87%	114%	147%	169%	111%	101%	100%	100%
	80%	100%	100%	102%	100%	106%	118%	180%	170%	108%	100%	100%	100%
	Average	89%	71%	82%	83%	76%	88%	102%	122%	97%	105%	100%	100%
	Max	47%	65%	92%	100%	89%	74%	70%	85%	58%	85%	106%	100%
	Min	100%	100%	100%	100%	100%	100%	100%	112%	100%	100%	100%	100%
No-Action Alternative - Existing License Conditions	20%	100%	100%	100%	103%	100%	113%	131%	159%	122%	100%	100%	100%
	50%	100%	100%	100%	95%	100%	120%	158%	171%	114%	100%	100%	100%
	80%	100%	100%	100%	100%	100%	118%	180%	172%	103%	100%	100%	100%
	Average	99%	100%	113%	108%	103%	116%	136%	170%	116%	109%	100%	101%
	Max	100%	100%	100%	110%	100%	100%	100%	122%	108%	154%	100%	129%
	Min	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Long Canyon Creek - Bottom of Reach (830.842)													
No-Action Alternative - Impaired Hydrology	20%	100%	99%	91%	92%	90%	95%	105%	110%	101%	104%	100%	100%
	50%	100%	100%	99%	94%	98%	102%	112%	122%	106%	100%	100%	100%
	80%	100%	100%	101%	100%	100%	106%	130%	120%	100%	100%	100%	100%
	Average	97%	85%	92%	93%	92%	96%	101%	109%	99%	101%	100%	100%
	Max	72%	76%	96%	100%	97%	89%	87%	93%	86%	98%	104%	100%
	Min	100%	100%	100%	100%	100%	100%	100%	128%	100%	100%	100%	100%
No-Action Alternative - Existing License Conditions	20%	100%	100%	100%	104%	100%	105%	109%	120%	105%	103%	100%	100%
	50%	100%	100%	100%	99%	100%	106%	115%	126%	105%	100%	100%	100%
	80%	100%	100%	100%	100%	97%	106%	128%	119%	100%	100%	100%	100%
	Average	100%	100%	105%	103%	101%	104%	110%	122%	104%	103%	100%	100%
	Max	100%	100%	100%	106%	100%	100%	100%	109%	102%	109%	100%	111%
	Min	100%	100%	100%	100%	100%	100%	100%	112%	100%	100%	100%	100%

[1]This difference is due to a change in water year type designation in two years between the No-Action Alternative and Proposed Action. The No-Action Alternative established flows based on two water-year type designations with winter flows based on the April forecast. The Proposed Action established flows based on five water-year type designations with winter flows based on an end of year forecast (typically in October). Although flows in the Proposed Action are higher in all water year types, in two years (1988 and 1993), the water year type designation that establishes winter flows changed between the Proposed Action and No-Action Alternative due to difference in the forecast months. This resulted in higher December flows under the No-Action Alternative.

Table 8.3-3. Hydrology Data Summary for MFP Reservoirs.

Reservoir Analysis	Exceedances and Summary Statistics	Storage (AF) 1975 - 2007											
		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
French Meadows Reservoir (530)													
Proposed Action - Future Demand	20%	79,395.0	64,266.0	51,793.0	54,935.4	66,795.0	84,883.0	96,451.8	118,156.0	130,942.0	123,527.4	104,898.0	88,149.0
	50%	72,912.0	58,423.0	47,699.0	45,796.0	47,490.5	57,414.0	74,922.0	99,475.0	120,586.0	113,125.0	95,236.0	82,084.0
	80%	61,217.0	51,880.0	43,134.0	42,563.2	43,707.0	49,300.0	61,292.2	81,759.0	94,422.0	85,566.8	72,953.2	63,977.0
	Average	69,628.8	57,395.3	49,363.8	52,966.6	56,400.5	64,898.7	78,164.7	98,239.4	113,543.1	106,601.4	90,622.3	77,049.0
	Max	93,843.0	91,658.0	111,476.0	111,476.0	111,476.0	111,476.0	121,049.0	134,852.0	134,852.0	134,852.0	127,777.0	107,106.0
	Min	22,213.0	16,587.0	15,771.0	25,874.0	29,726.0	35,622.0	47,199.0	37,011.0	58,515.0	47,532.0	33,763.0	25,379.0
No-Action Alternative - Impaired Hydrology	20%	86,165.2	73,505.6	71,860.0	79,740.8	92,408.0	95,001.8	101,457.6	124,000.0	133,600.0	130,488.4	114,885.2	100,061.4
	50%	75,255.0	62,585.0	57,400.0	59,300.0	61,100.0	67,200.0	83,500.0	103,800.0	124,050.0	119,335.0	105,361.0	89,750.0
	80%	46,140.0	42,579.0	43,293.0	48,888.0	49,572.0	50,404.0	62,559.2	85,060.0	97,651.0	90,940.0	71,940.0	58,420.0
	Average	69,993.6	61,132.1	59,661.6	64,444.6	66,636.4	70,688.7	81,193.9	101,735.7	115,689.5	110,282.0	95,845.9	81,621.1
	Max	100,035.0	99,404.0	112,870.0	122,900.0	116,180.0	121,200.0	127,900.0	136,100.0	137,113.0	136,405.0	131,441.0	112,248.0
	Min	28,500.0	29,200.0	29,800.0	30,400.0	30,900.0	34,000.0	40,323.0	46,520.0	53,654.0	51,784.0	33,900.0	33,100.0
No-Action Alternative - Existing License Conditions	20%	85,324.0	71,790.0	59,905.0	62,885.0	75,223.6	86,831.8	101,027.0	127,095.0	134,150.0	125,682.6	108,468.0	93,265.0
	50%	78,756.0	65,378.5	54,079.0	54,882.0	56,413.0	65,136.0	81,705.0	109,216.0	126,959.0	116,465.0	99,237.0	86,753.5
	80%	66,991.0	57,049.0	48,202.0	47,366.0	48,538.0	56,812.4	68,971.0	88,261.0	107,477.0	97,556.4	82,519.0	71,160.8
	Average	76,234.1	64,423.9	56,684.7	59,911.2	62,913.0	70,901.0	84,323.0	107,259.6	119,160.9	111,145.4	95,614.7	82,885.1
	Max	94,074.0	96,991.0	111,476.0	111,476.0	111,476.0	111,476.0	125,061.0	134,852.0	134,852.0	134,852.0	129,010.0	110,092.0
	Min	41,872.0	41,249.0	40,170.0	37,529.0	37,976.0	38,576.0	50,668.0	55,061.0	62,637.0	54,792.0	48,286.0	44,414.0
Hell Hole Reservoir (540)													
Proposed Action - Future Demand	20%	135,031.2	131,271.0	113,052.8	115,789.0	126,738.2	161,288.2	170,811.0	197,941.0	207,966.0	194,660.0	166,639.0	138,495.0
	50%	128,173.0	117,478.0	101,668.0	101,827.0	104,735.0	118,233.0	139,812.0	169,962.0	193,873.5	178,120.0	149,961.0	128,393.0
	80%	101,288.2	98,393.0	87,842.4	96,180.0	97,986.6	104,007.0	118,889.0	144,143.4	155,282.0	139,642.2	118,737.0	100,719.0
	Average	117,044.2	112,520.8	104,327.7	110,428.0	114,285.8	125,599.5	142,214.9	167,676.8	181,097.9	167,054.1	142,314.9	119,839.8
	Max	164,994.0	204,222.0	207,590.0	207,590.0	207,590.0	207,590.0	215,178.0	215,178.0	215,178.0	215,178.0	202,364.0	174,123.0
	Min	5,775.0	5,276.0	6,453.0	29,075.0	31,660.0	42,725.0	48,842.0	56,697.0	63,944.0	42,393.0	24,973.0	9,505.0
No-Action Alternative - Impaired Hydrology	20%	138,476.4	135,232.2	129,125.2	128,076.8	140,056.8	165,629.0	172,161.6	198,400.0	205,072.0	196,961.2	173,054.6	148,231.4
	50%	123,100.0	114,100.0	105,700.0	101,787.0	102,050.0	107,512.0	123,050.0	155,300.0	187,151.0	176,057.0	146,100.0	124,520.0
	80%	101,600.0	85,500.0	77,733.6	77,400.0	78,620.0	81,081.8	99,093.4	124,165.8	144,781.6	136,023.2	125,028.0	102,980.0
	Average	117,588.8	110,612.1	105,430.6	108,953.8	110,845.3	117,324.7	132,576.4	158,490.3	174,011.7	164,780.4	144,001.1	123,256.1
	Max	167,400.0	182,702.0	211,050.0	213,100.0	208,845.0	210,700.0	208,845.0	211,100.0	209,348.0	209,000.0	202,018.0	181,825.0
	Min	35,000.0	34,001.0	40,100.0	40,200.0	41,700.0	51,100.0	71,900.0	87,836.0	83,000.0	74,400.0	50,600.0	37,509.0
No-Action Alternative - Existing License Conditions	20%	126,686.0	129,495.0	108,972.0	117,478.0	119,665.0	158,281.8	174,598.8	197,697.0	206,089.0	188,255.4	161,095.0	133,338.0
	50%	119,834.0	116,808.0	98,518.0	98,283.0	102,501.0	112,987.0	134,884.5	166,309.0	192,007.0	173,556.0	146,177.0	125,254.0
	80%	109,461.0	104,535.0	90,332.8	88,790.4	89,213.0	100,561.0	114,841.2	143,542.0	152,007.6	136,484.8	121,596.0	109,950.0
	Average	119,110.1	117,761.7	106,213.5	111,375.2	115,013.7	126,332.0	142,582.0	168,082.0	181,686.4	167,068.4	144,288.7	123,558.8
	Max	156,743.0	194,539.0	207,590.0	207,590.0	207,590.0	207,590.0	207,590.0	207,590.0	207,590.0	207,590.0	199,287.0	170,185.0
	Min	96,490.0	81,997.0	81,047.0	82,878.0	82,510.0	84,798.0	91,108.0	98,440.0	111,013.0	108,160.0	103,496.0	89,515.0

Table 8.3-4. Hydrology Statistics for the Proposed Action as a Percentage of the No-Action Alternative for MFP Reservoirs.

Reservoir Analysis	Exceedances and Summary	Storage (AF) 1975 - 2007											
		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
French Meadows Reservoir (530)													
No-Action Alternative - Impaired Hydrology	20%	92%	87%	72%	69%	72%	89%	95%	95%	98%	95%	91%	88%
	50%	97%	93%	83%	77%	78%	85%	90%	96%	97%	95%	90%	91%
	80%	133%	122%	100%	87%	88%	98%	98%	96%	97%	94%	101%	110%
	Average	99%	94%	83%	82%	85%	92%	96%	97%	98%	97%	95%	94%
	Max	94%	92%	99%	91%	96%	92%	95%	99%	98%	99%	97%	95%
	Min	78%	57%	53%	85%	96%	105%	117%	80%	109%	92%	100%	77%
No-Action Alternative - Existing License Conditions	20%	93%	90%	86%	87%	89%	98%	95%	93%	98%	98%	97%	95%
	50%	93%	89%	88%	83%	84%	88%	92%	91%	95%	97%	96%	95%
	80%	91%	91%	89%	90%	90%	87%	89%	93%	88%	88%	88%	90%
	Average	91%	89%	87%	88%	90%	92%	93%	92%	95%	96%	95%	93%
	Max	100%	95%	100%	100%	100%	100%	97%	100%	100%	100%	99%	97%
	Min	53%	40%	39%	69%	78%	92%	93%	67%	93%	87%	70%	57%
Hell Hole Reservoir (540)													
No-Action Alternative - Impaired Hydrology	20%	98%	97%	88%	90%	90%	97%	99%	100%	101%	99%	96%	93%
	50%	104%	103%	96%	100%	103%	110%	114%	109%	104%	101%	103%	103%
	80%	100%	115%	113%	124%	125%	128%	120%	116%	107%	103%	95%	98%
	Average	100%	102%	99%	101%	103%	107%	107%	106%	104%	101%	99%	97%
	Max	99%	112%	98%	97%	99%	99%	103%	102%	103%	103%	100%	96%
	Min	17%	16%	16%	72%	76%	84%	68%	65%	77%	57%	49%	25%
No-Action Alternative - Existing License Conditions	20%	107%	101%	104%	99%	106%	102%	98%	100%	101%	103%	103%	104%
	50%	107%	101%	103%	104%	102%	105%	104%	102%	101%	103%	103%	103%
	80%	93%	94%	97%	108%	110%	103%	104%	100%	102%	102%	98%	92%
	Average	98%	96%	98%	99%	99%	99%	100%	100%	100%	100%	99%	97%
	Max	105%	105%	100%	100%	100%	100%	104%	104%	104%	104%	102%	102%
	Min	6%	6%	8%	35%	38%	50%	54%	58%	58%	39%	24%	11%

Table 8.3-5. Middle Fork Project Hydrology Data Summary for MFP Powerhouses.

Powerhouse Analysis	Exceedances and Summary Statistics	Flow (cfs) 1975 - 2007											
		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
French Meadows Powerhouse (530.540)													
Proposed Action - Existing Demand	0.2	316.8	366.4	385.2	307.8	240.8	318.5	305.1	391.8	400.0	364.9	319.6	240.2
	0.5	176.1	248.3	151.8	67.1	0.0	0.0	38.9	5.9	128.3	248.1	246.2	135.2
	0.8	37.9	79.9	5.9	0.0	0.0	0.0	0.0	0.0	0.0	163.9	162.8	75.6
	Average	179.4	226.0	182.5	130.2	86.9	123.2	128.6	132.5	175.2	254.7	239.6	152.8
	Max	400.0	400.0	400.0	400.0	400.0	400.0	390.9	400.0	400.0	400.0	400.0	382.4
	Min	0.4	1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	26.0	13.6	0.0
No-Action Alternative - Impaired Hydrology	0.2	329.7	299.4	243.8	245.3	328.3	342.3	326.4	328.9	326.4	321.5	322.3	318.1
	0.5	220.9	25.3	0.0	0.0	83.7	111.9	0.0	0.0	197.2	229.2	234.7	209.0
	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	149.8	174.0	0.0
	Average	190.5	128.1	98.0	92.4	139.7	152.9	123.4	126.4	179.9	222.2	229.8	195.2
	Max	404.3	390.4	377.0	397.7	394.3	398.4	400.8	391.2	389.3	388.3	363.2	364.9
	Min	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Middle Fork Powerhouse (823.810)													
Proposed Action - Existing Demand	0.2	0.0	905.0	743.1	677.3	706.0	920.0	763.6	916.0	921.4	906.1	842.5	692.7
	0.5	0.0	753.6	339.4	110.1	3.3	0.0	105.6	379.2	556.3	641.8	642.1	321.8
	0.8	0.0	332.2	23.6	0.0	0.0	0.0	0.0	0.0	227.5	384.9	376.3	212.7
	Average	56.3	633.0	387.4	281.8	274.9	349.2	326.4	418.4	568.7	628.7	613.1	409.0
	Max	920.0	910.0	940.0	940.0	940.0	940.0	940.0	940.0	940.0	929.5	920.0	910.0
	Min	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	90.6	83.9	0.0
No-Action Alternative - Impaired Hydrology	0.2	573.4	586.4	671.0	516.5	779.3	825.0	830.4	897.6	892.8	811.6	827.6	675.9
	0.5	52.7	391.4	265.9	221.8	335.5	340.0	260.6	406.2	553.3	563.7	609.5	451.6
	0.8	0.0	26.4	6.0	0.0	8.8	0.0	0.0	0.0	232.7	344.3	380.0	125.2
	Average	259.0	358.1	343.2	289.3	389.9	409.3	378.6	446.7	540.9	547.1	577.2	439.8
	Max	989.8	933.0	978.4	964.6	963.4	985.7	954.7	982.5	980.8	949.8	947.8	952.8
	Min	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ralston Powerhouse (810.815)													
Proposed Action - Existing Demand	0.2	0.0	915.5	852.1	866.3	922.3	924.0	924.0	924.0	924.0	911.1	842.6	686.4
	0.5	0.0	782.5	373.5	169.2	164.9	210.5	249.7	432.2	582.1	649.8	637.0	320.1
	0.8	0.0	340.3	55.7	19.9	25.5	70.5	61.0	34.3	249.9	387.5	376.0	209.7
	Average	57.0	654.2	432.3	339.9	360.6	446.5	422.1	474.5	582.7	635.8	612.1	406.0
	Max	924.0	924.0	924.0	924.0	924.0	924.0	924.0	924.0	924.0	924.0	924.0	923.6
	Min	0.0	0.0	0.0	0.0	0.0	0.0	11.1	0.0	1.5	91.6	84.2	0.0
No-Action Alternative - Impaired Hydrology	0.2	590.9	602.3	738.8	642.6	889.7	908.2	909.8	910.4	909.0	816.8	817.8	673.4
	0.5	55.3	437.0	322.9	284.5	441.2	572.2	451.1	577.5	582.8	590.8	607.0	479.6
	0.8	0.0	44.2	24.5	23.7	40.8	71.9	61.3	47.7	254.1	372.9	408.1	129.6
	Average	267.1	389.5	382.9	356.1	447.0	501.3	464.0	517.8	561.7	560.2	582.7	448.2
	Max	971.0	917.3	931.0	924.7	930.2	929.9	929.7	930.1	930.2	1,118.3	929.9	925.0
	Min	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Oxbow Powerhouse (845.847)													
Proposed Action - Existing Demand	0.2	0.0	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0	988.2	800.4
	0.5	0.0	919.9	573.8	431.7	738.4	1,000.0	1,000.0	1,000.0	755.8	774.8	737.8	436.8
	0.8	0.0	427.1	191.6	147.6	196.1	364.0	310.1	214.9	360.3	462.9	437.8	273.5
	Average	61.1	743.9	588.1	542.2	632.9	729.1	725.0	666.4	708.3	736.3	703.1	502.5
	Max	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0
	Min	0.0	0.0	75.0	75.0	75.0	80.0	75.0	78.1	75.0	121.0	112.8	0.0
No-Action Alternative - Impaired Hydrology	0.2	730.0	760.0	932.8	986.0	1,050.0	1,060.0	1,060.0	1,060.0	1,050.0	933.0	933.0	805.0
	0.5	286.0	481.0	452.0	594.0	790.0	905.0	834.0	858.0	723.0	696.0	715.0	534.0
	0.8	0.0	81.4	120.2	165.0	301.0	414.0	284.4	188.0	344.6	414.0	414.0	188.0
	Average	345.2	472.7	507.2	569.1	684.7	762.1	701.8	695.0	672.0	641.0	654.0	519.1
	Max	1,100.0	1,080.0	1,080.0	1,110.0	1,110.0	1,210.0	1,230.0	1,110.0	1,110.0	1,080.0	1,070.0	1,080.0
	Min	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

FIGURES

Figure 8.3-1. Graphs of Monthly Exceedance Curves (20%, 50%, and 80%) for Selected Locations in the Large Bypass and Peaking Reaches.

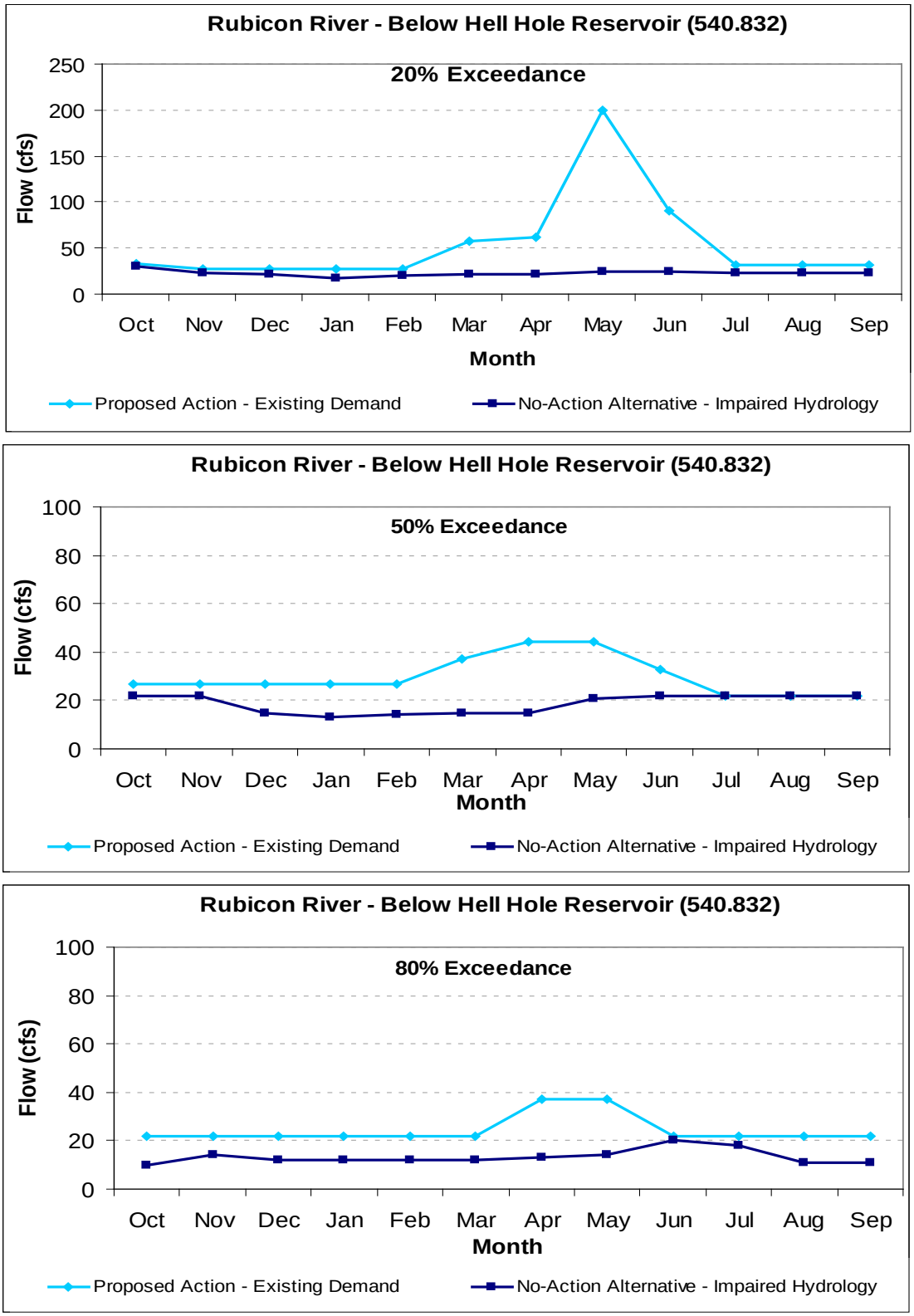
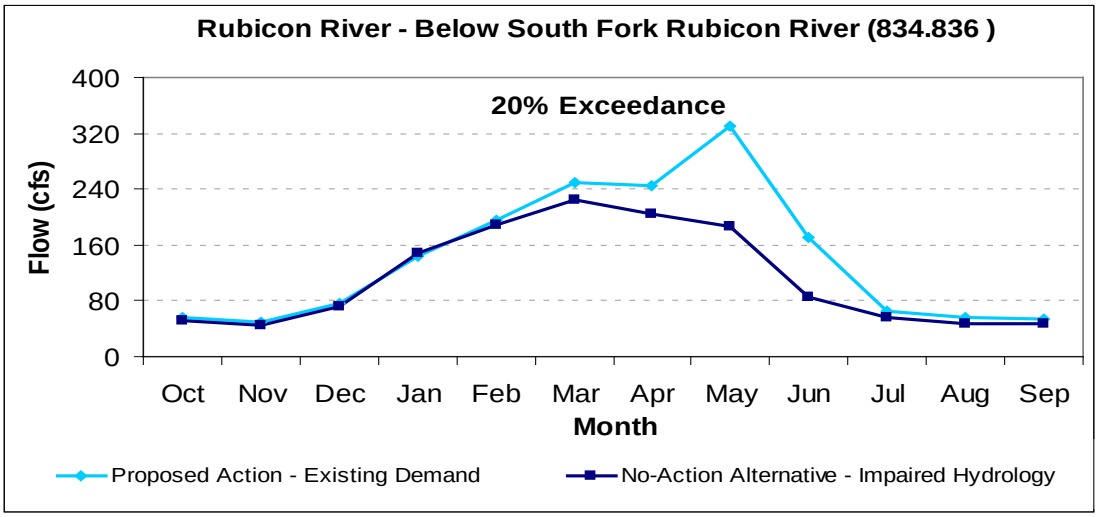
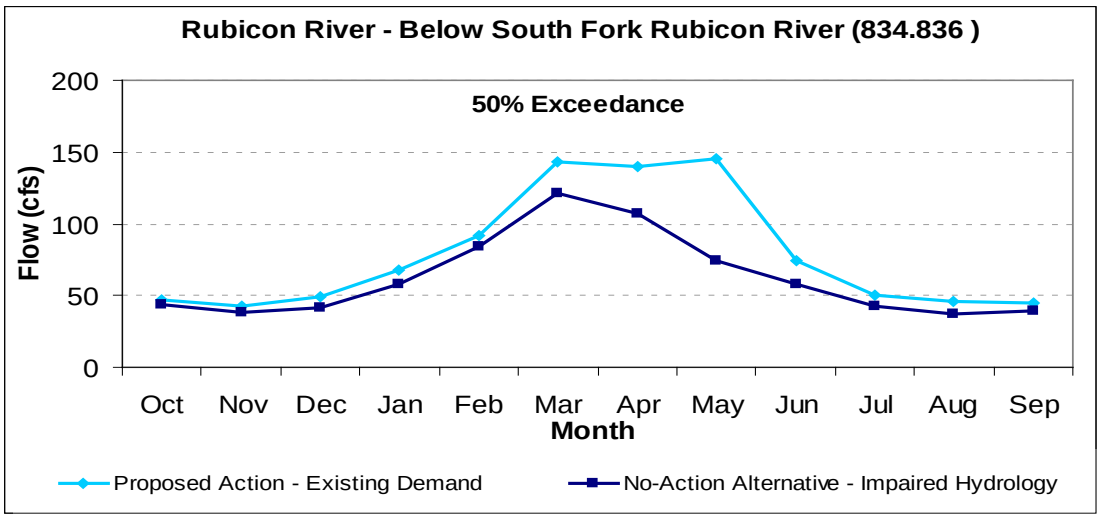


Figure 8.3-1. Graphs of Monthly Exceedance Curves (20%, 50%, and 80%) for Selected Locations in the Large Bypass and Peaking Reaches (continued).





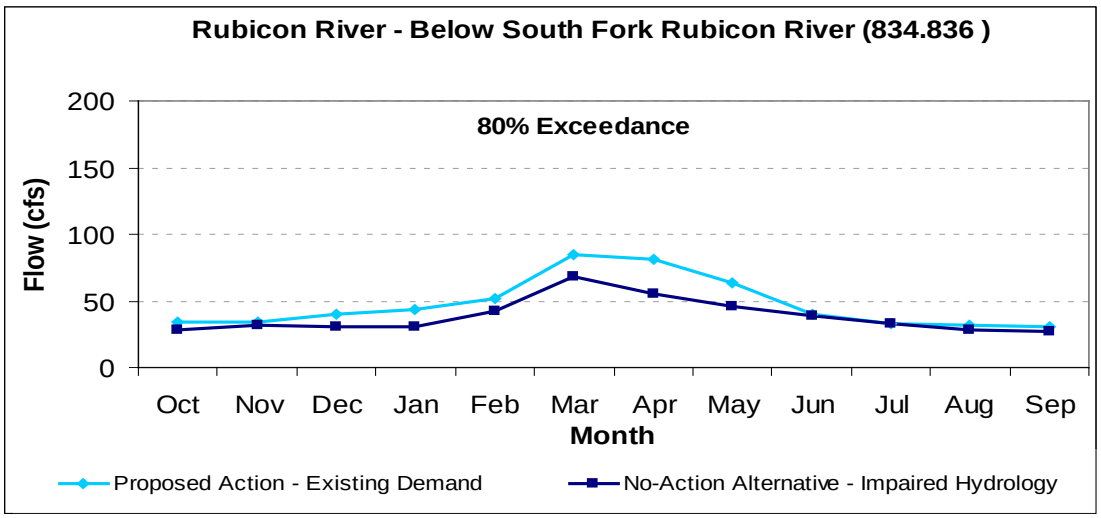
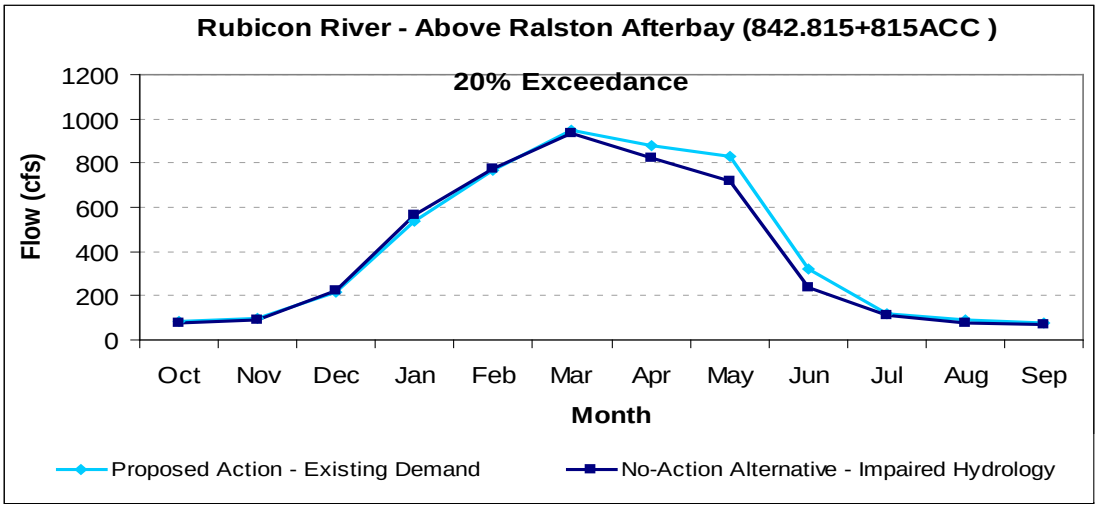
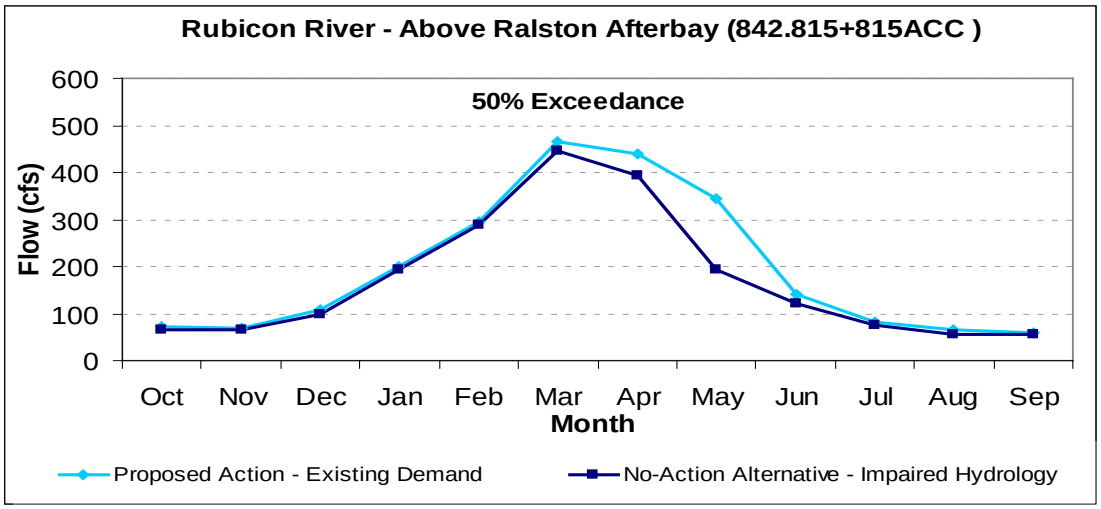


Figure 8.3-1. Graphs of Monthly Exceedance Curves (20%, 50%, and 80%) for Selected Locations in the Large Bypass and Peaking Reaches (continued).





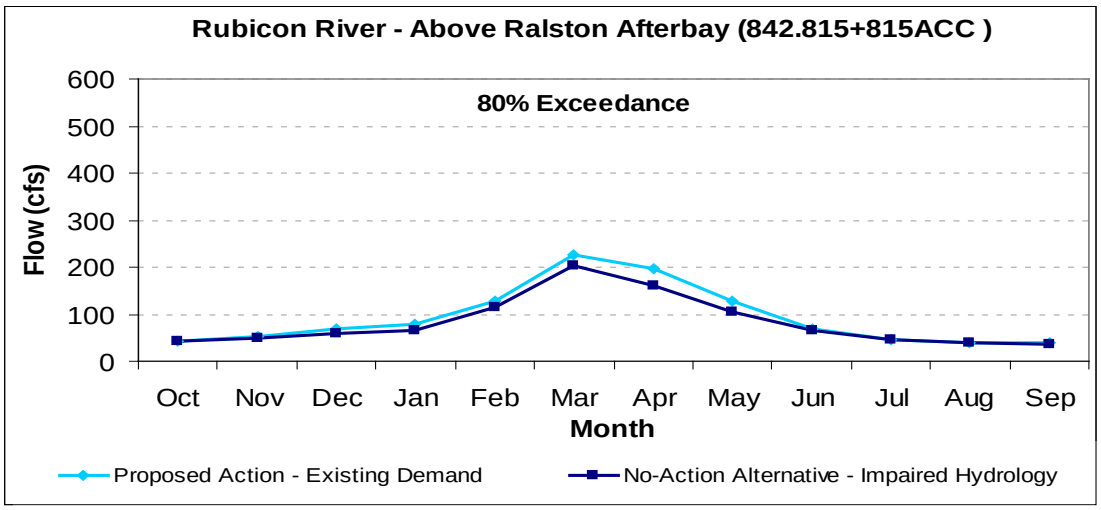


Figure 8.3-1. Graphs of Monthly Exceedance Curves (20%, 50%, and 80%) for Selected Locations in the Large Bypass and Peaking Reaches (continued).

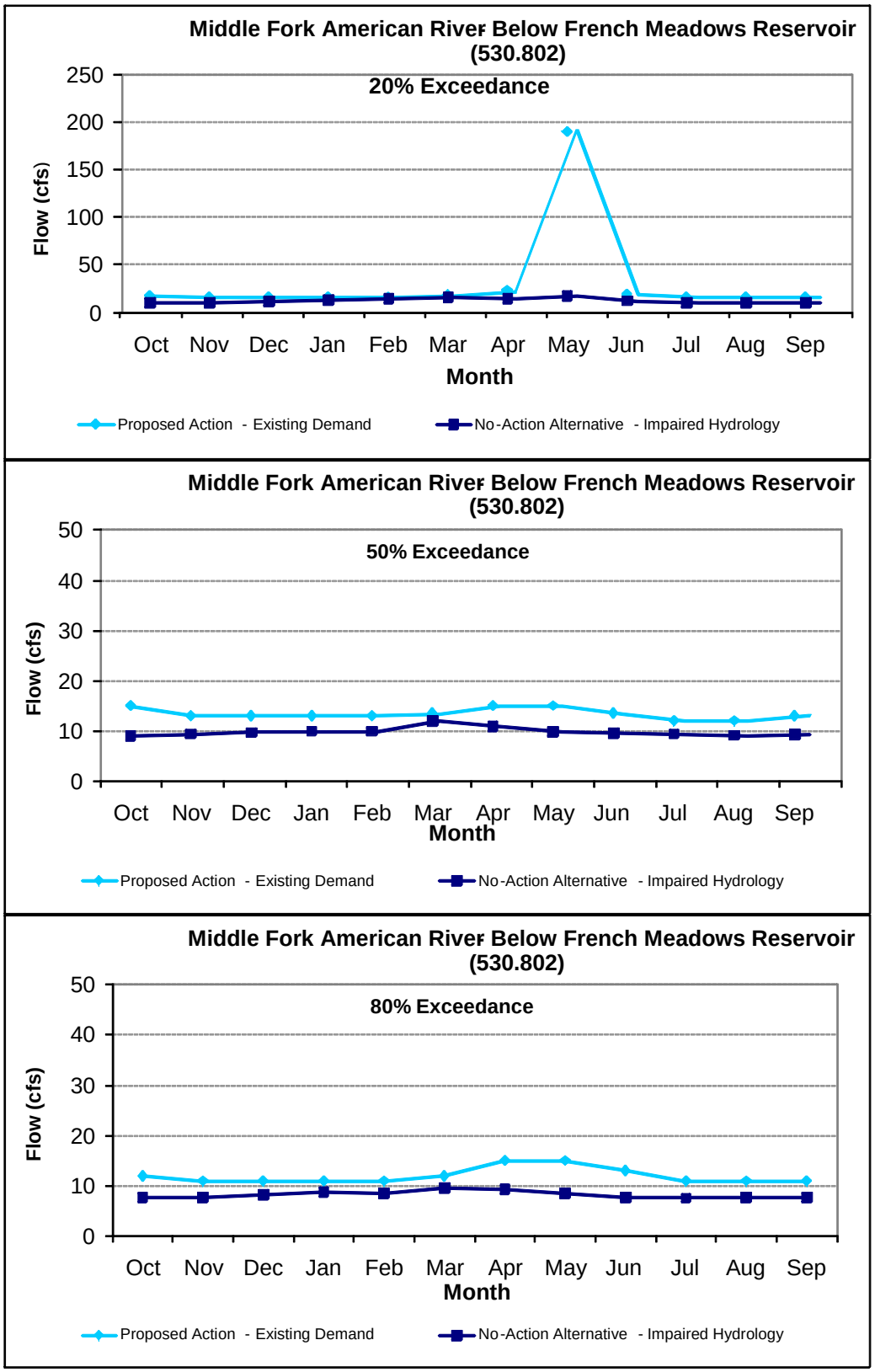


Figure 8.3-1. Graphs of Monthly Exceedance Curves (20%, 50%, and 80%) for Selected Locations in the Large Bypass and Peaking Reaches (continued).

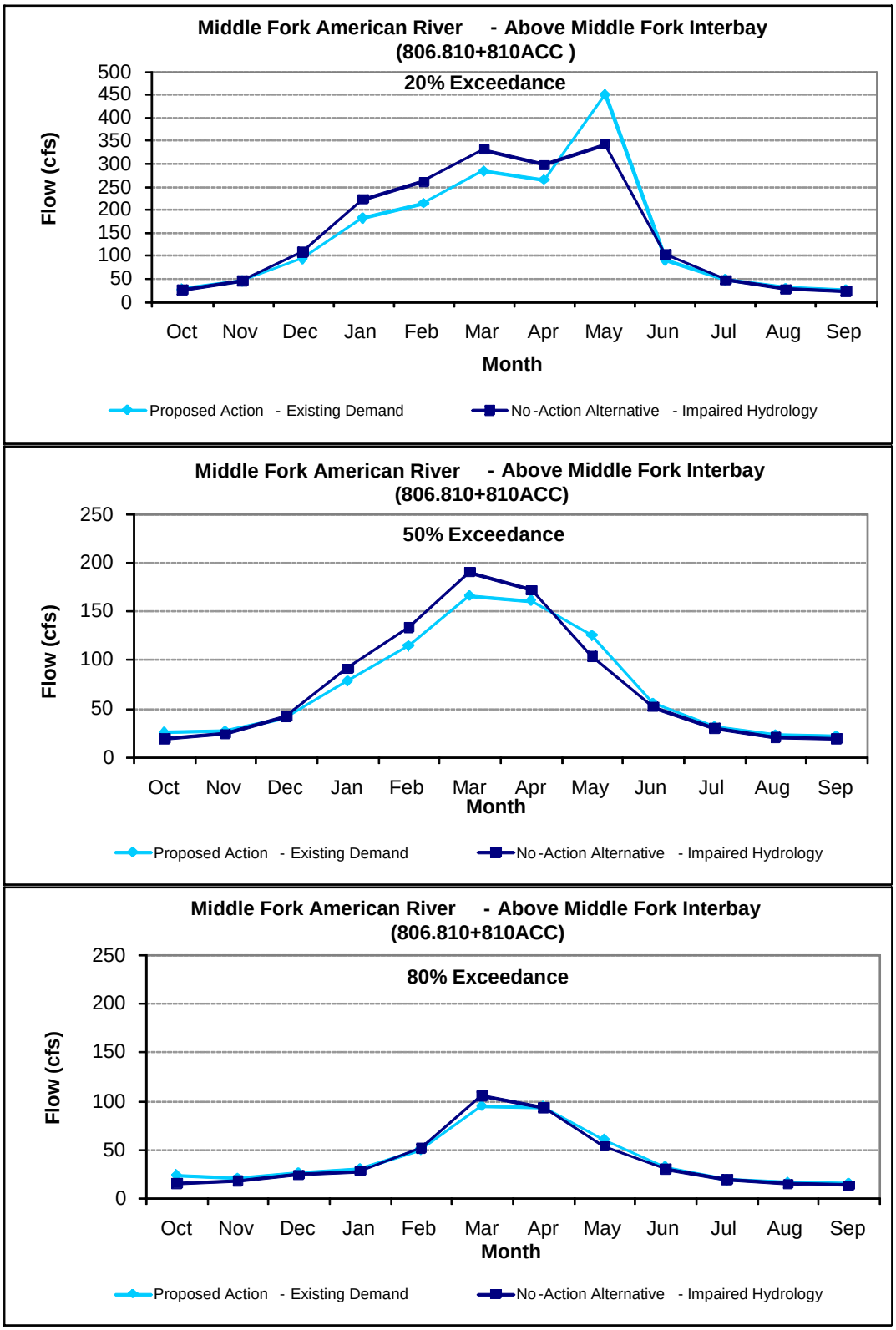


Figure 8.3-1. Graphs of Monthly Exceedance Curves (20%, 50%, and 80%) for Selected Locations in the Large Bypass and Peaking Reaches (continued).

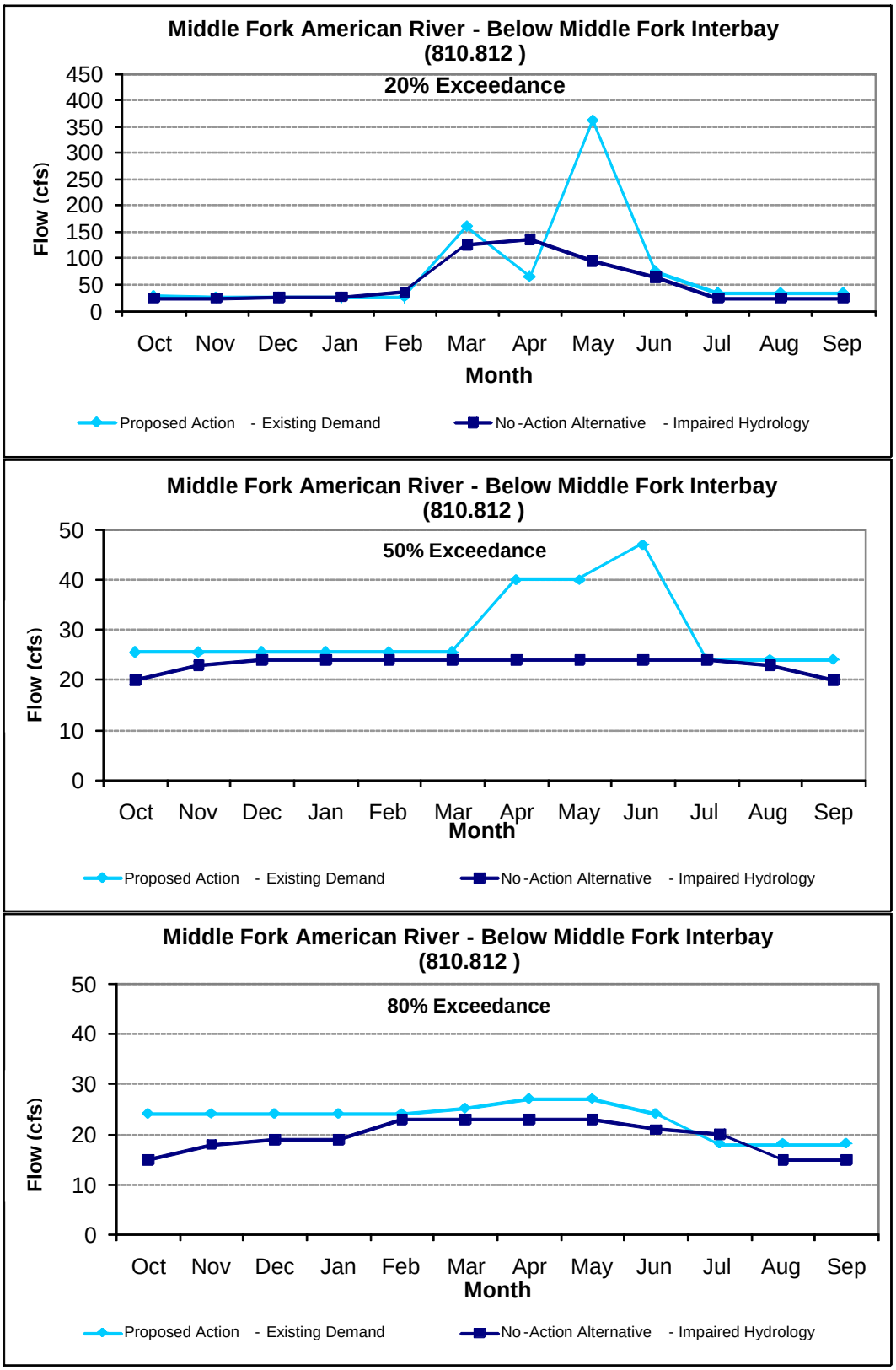
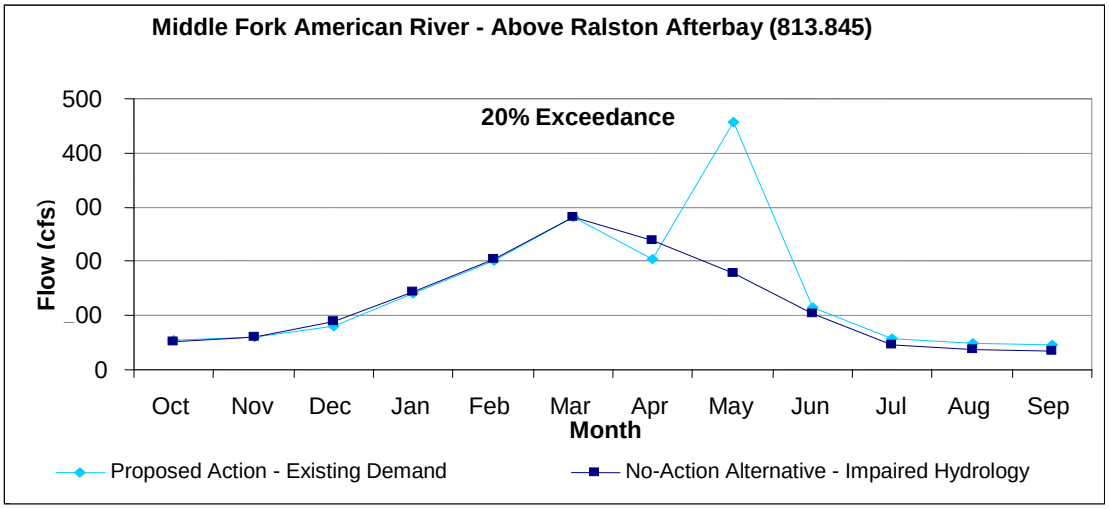
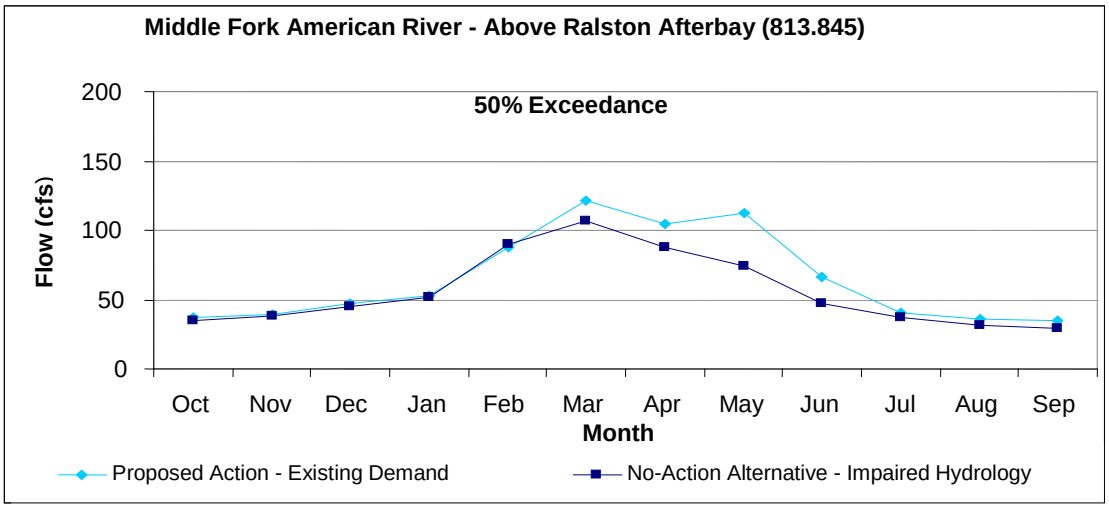


Figure 8.3-1. Graphs of Monthly Exceedance Curves (20%, 50%, and 80%) for Selected Locations in the Large Bypass and Peaking Reaches (continued).





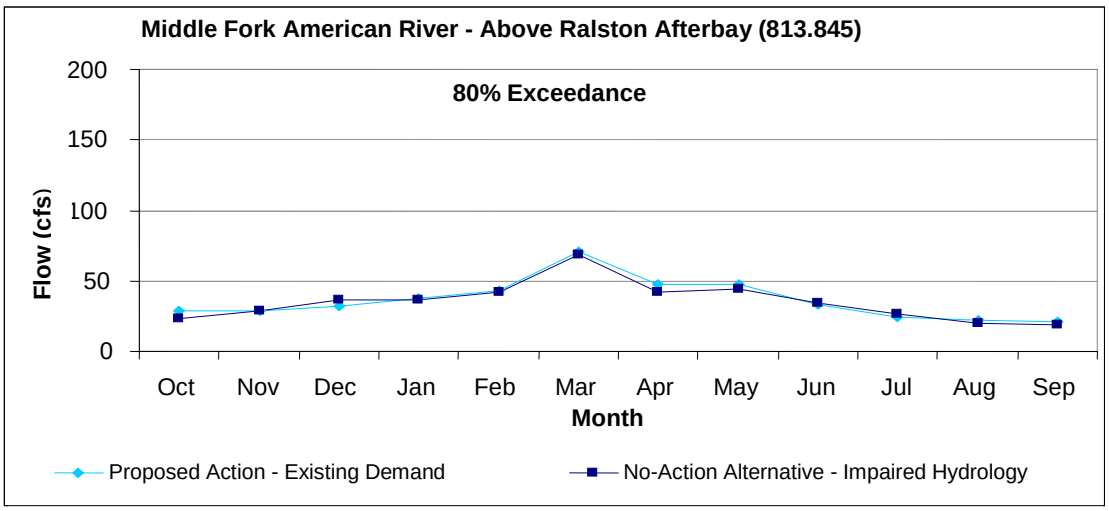


Figure 8.3-1. Graphs of Monthly Exceedance Curves (20%, 50%, and 80%) for Selected Locations in the Large Bypass and Peaking Reaches (continued).

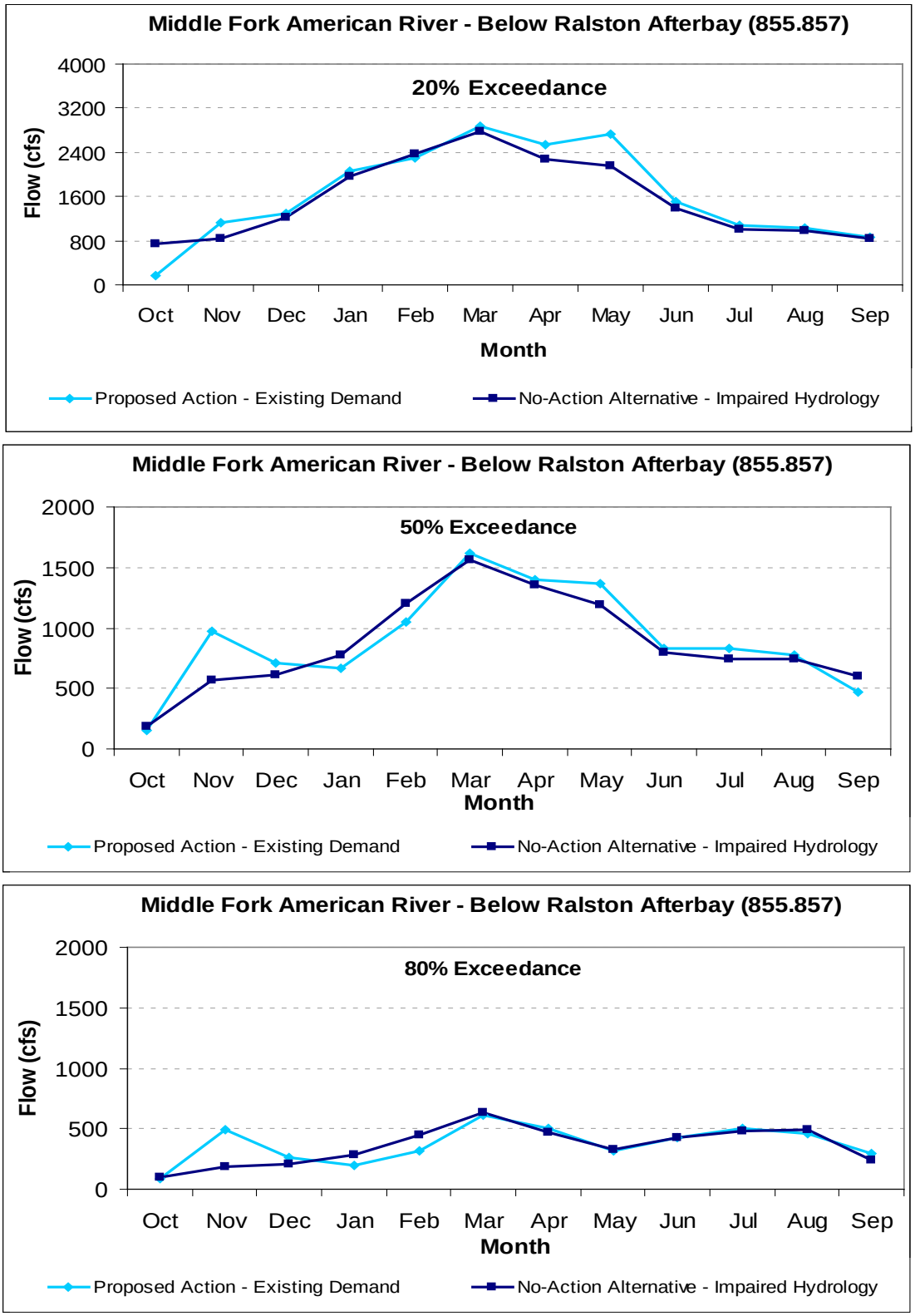
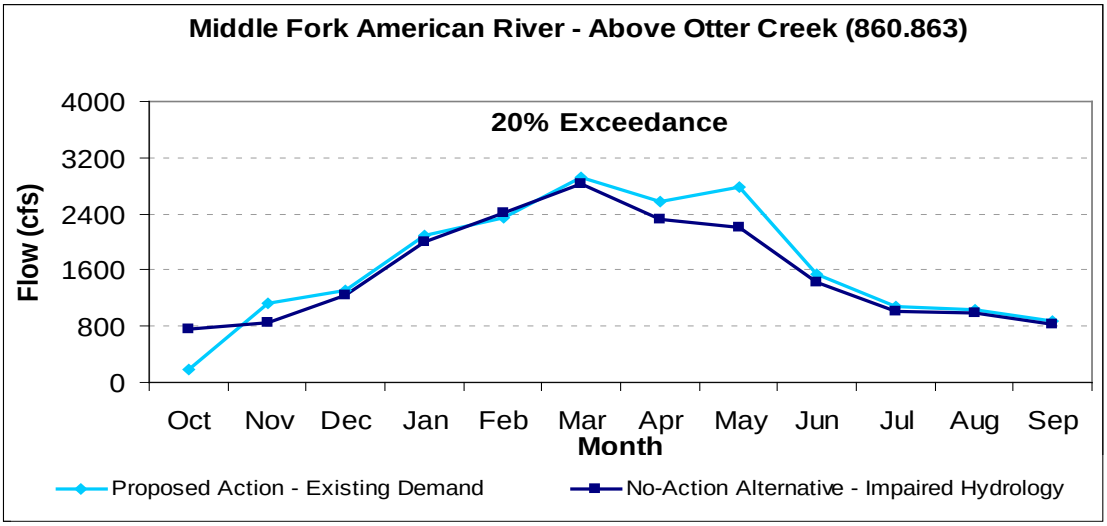
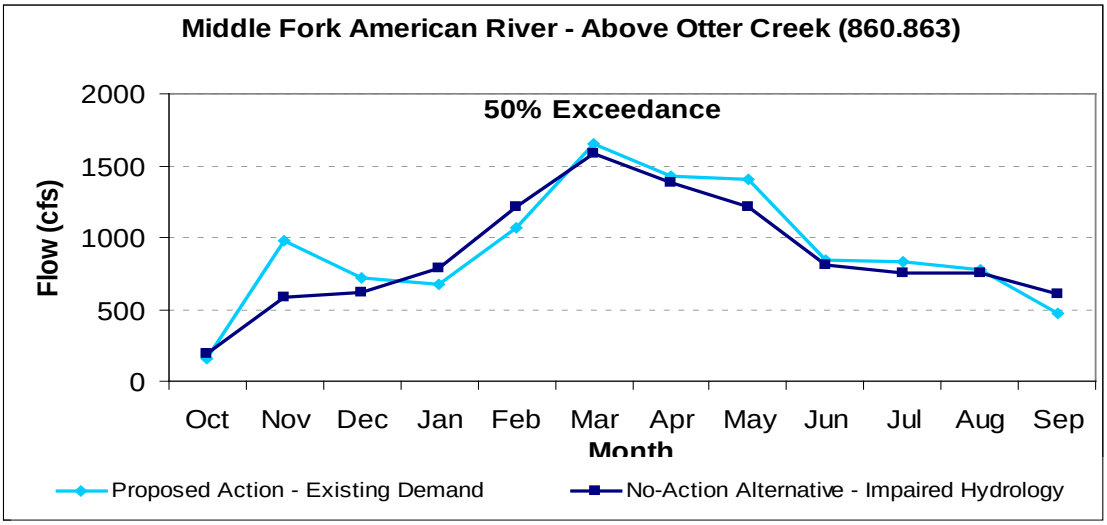


Figure 8.3-1. Graphs of Monthly Exceedance Curves (20%, 50%, and 80%) for Selected Locations in the Large Bypass and Peaking Reaches (continued).





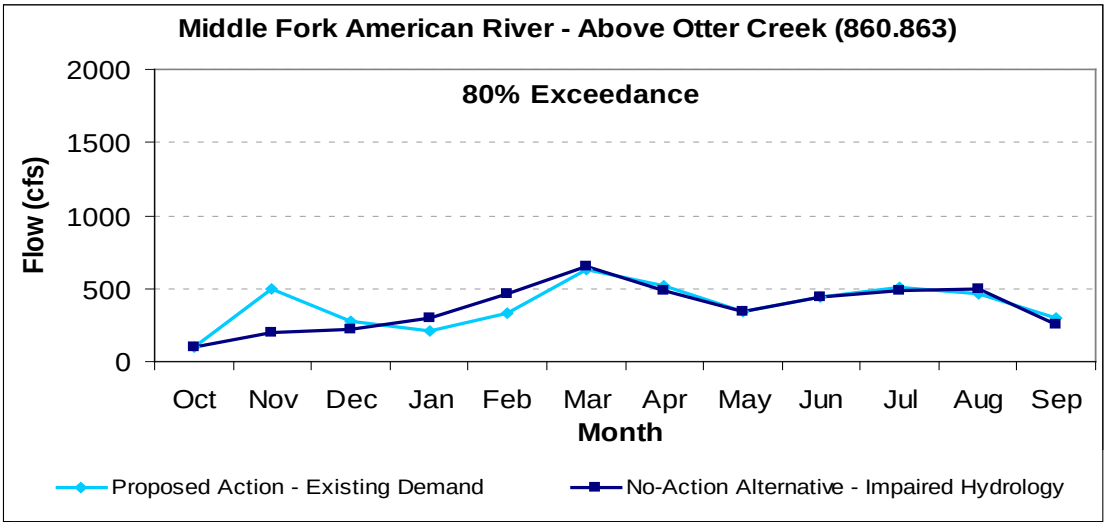
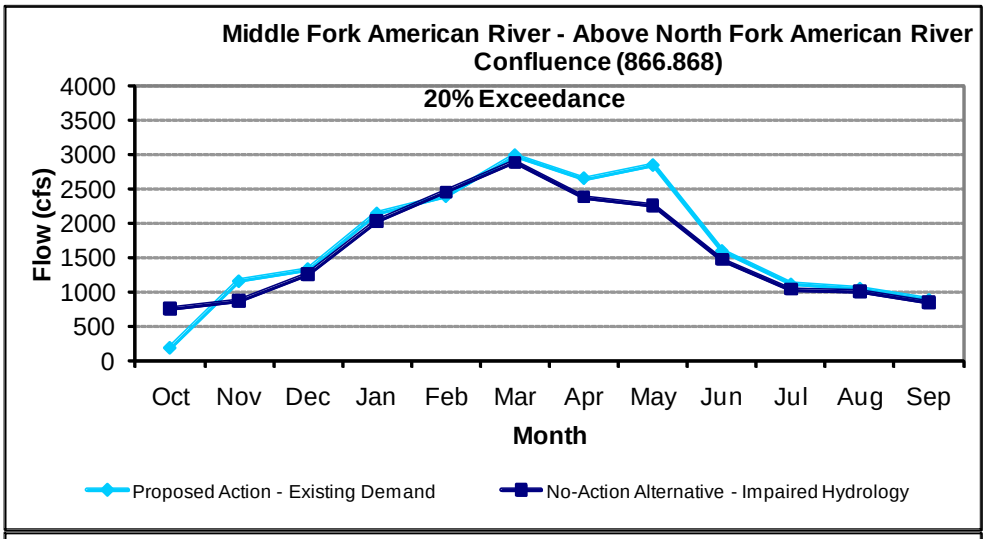
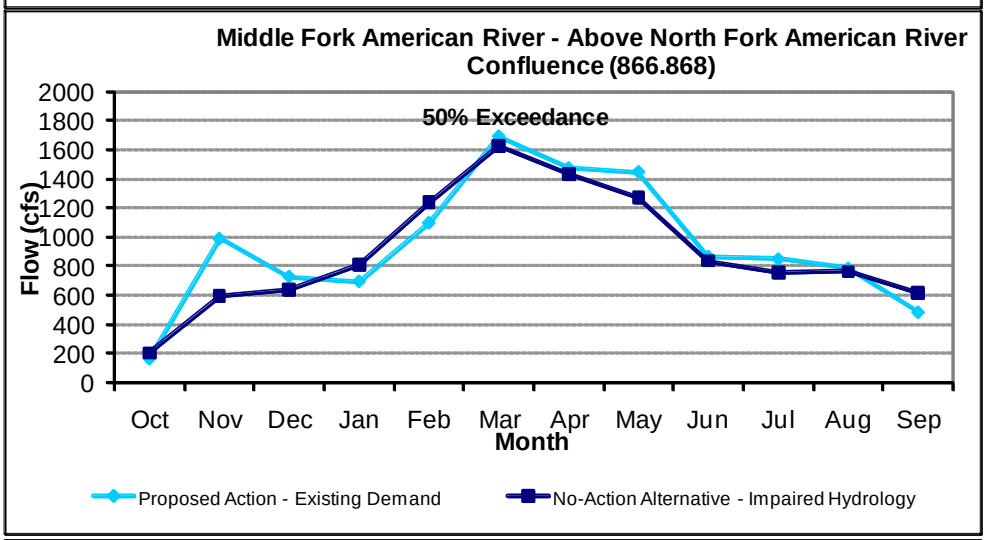


Figure 8.3-1. Graphs of Monthly Exceedance Curves (20%, 50%, and 80%) for Selected Locations in the Large Bypass and Peaking Reaches (continued).





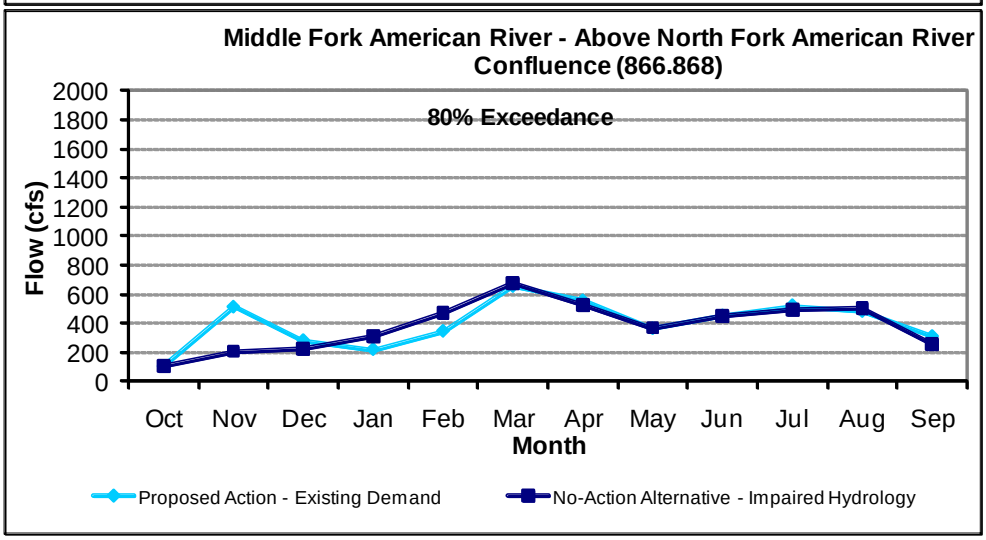
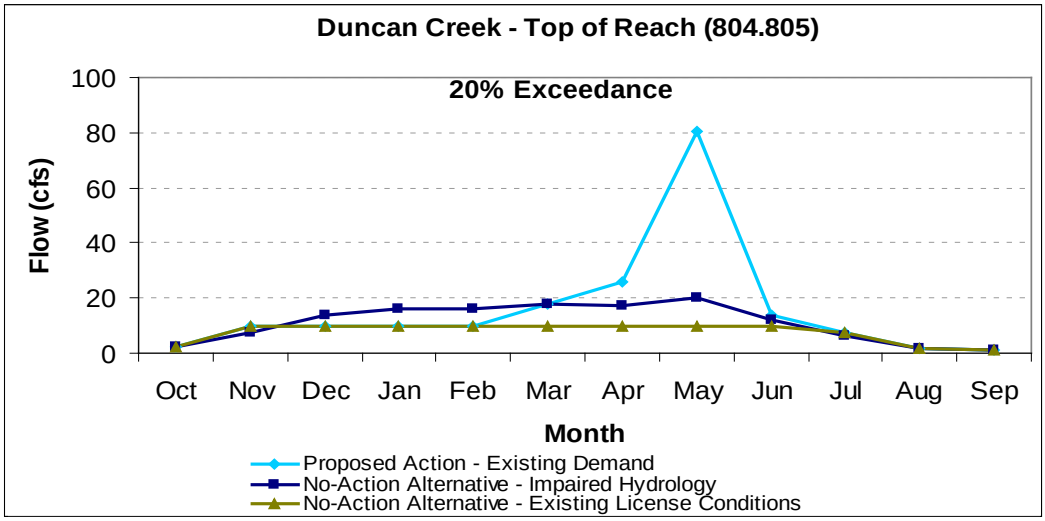
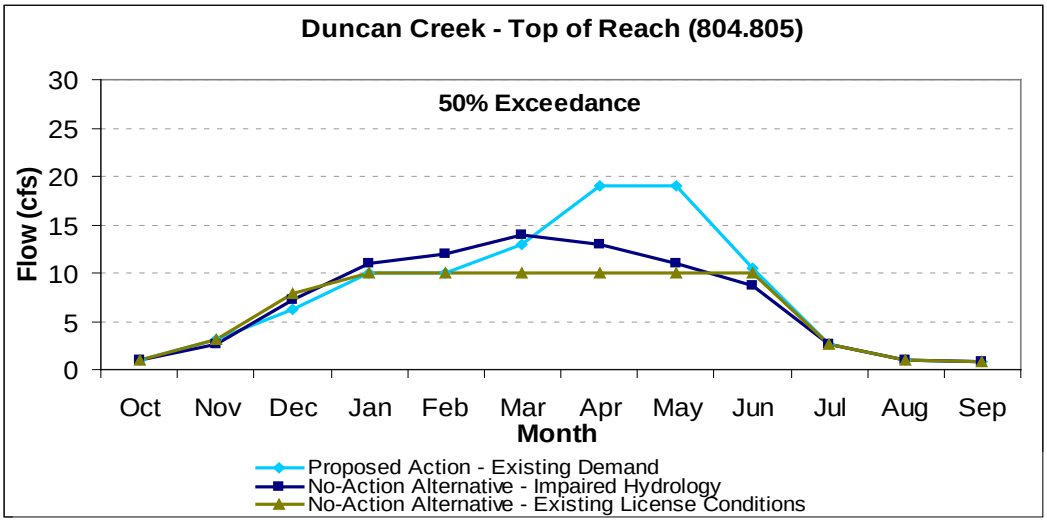


Figure 8.3-2. Graphs of Monthly Exceedance Curves (20%, 50%, and 80%) for Selected Locations in the Small Bypass Reaches.





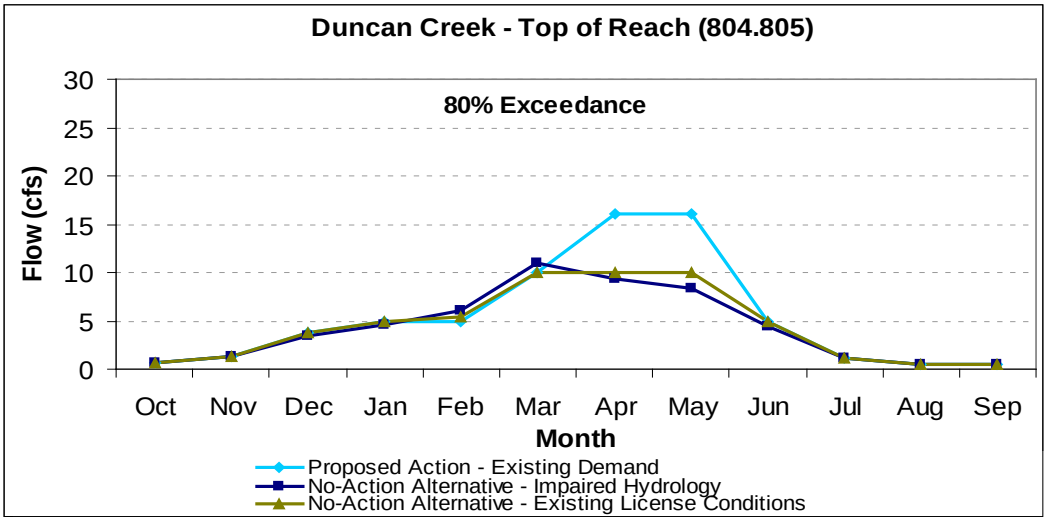


Figure 8.3-2. Graphs of Monthly Exceedance Curves (20%, 50%, and 80%) for Selected Locations in the Small Bypass Reaches (continued).

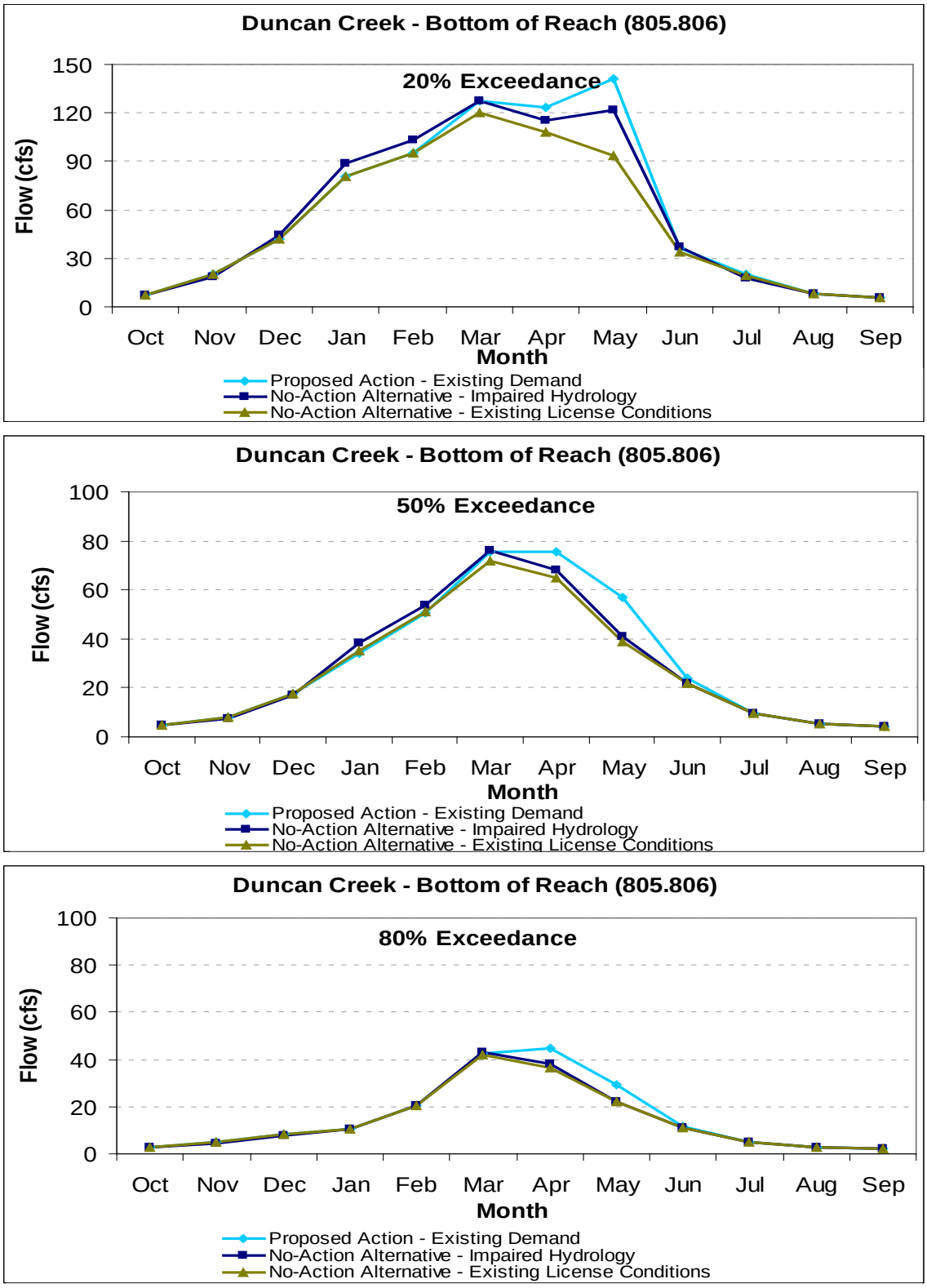


Figure 8.3-2. Graphs of Monthly Exceedance Curves (20%, 50%, and 80%) for Selected Locations in the Small Bypass Reaches (continued).

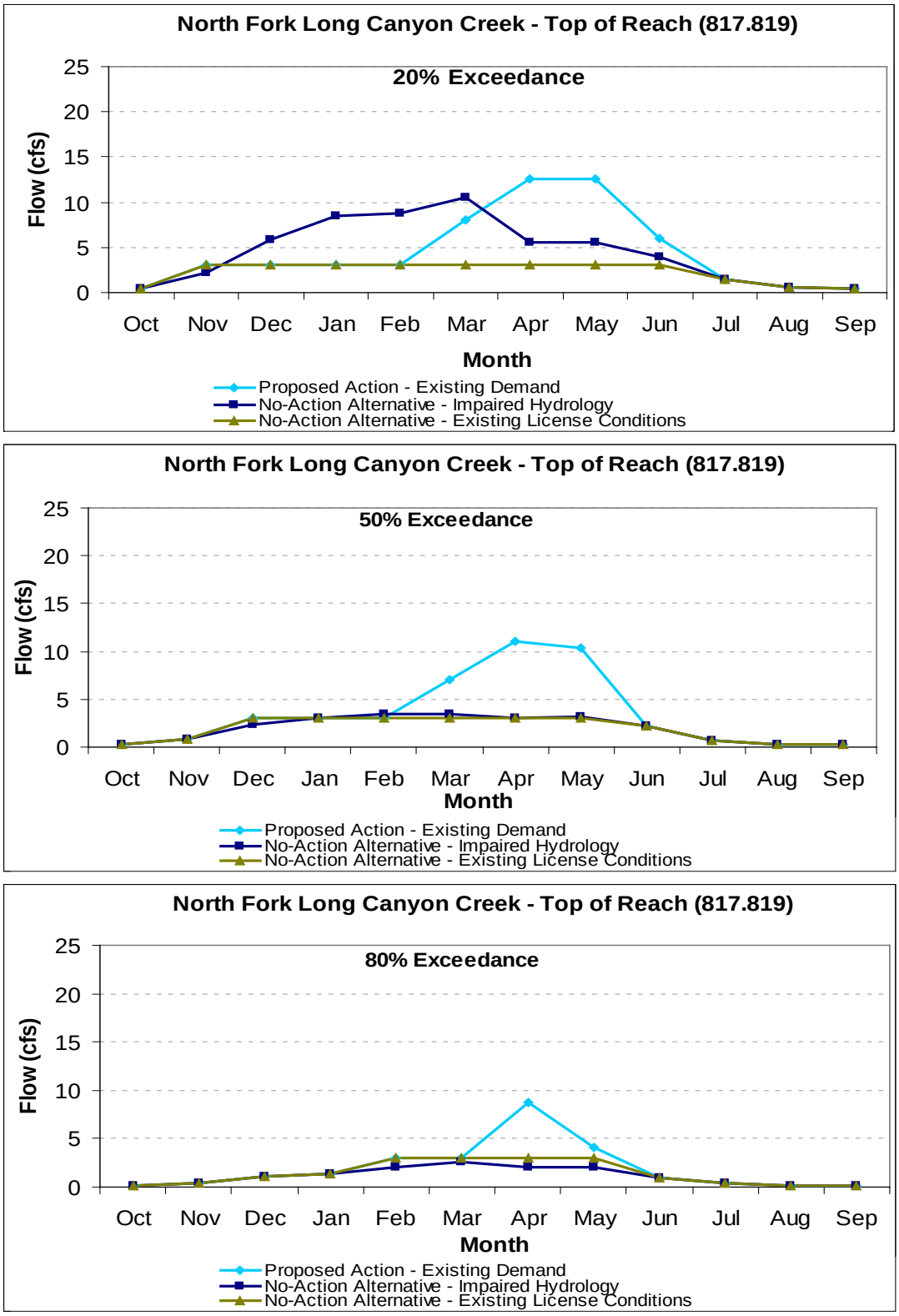


Figure 8.3-2. Graphs of Monthly Exceedance Curves (20%, 50%, and 80%) for Selected Locations in the Small Bypass Reaches (continued).

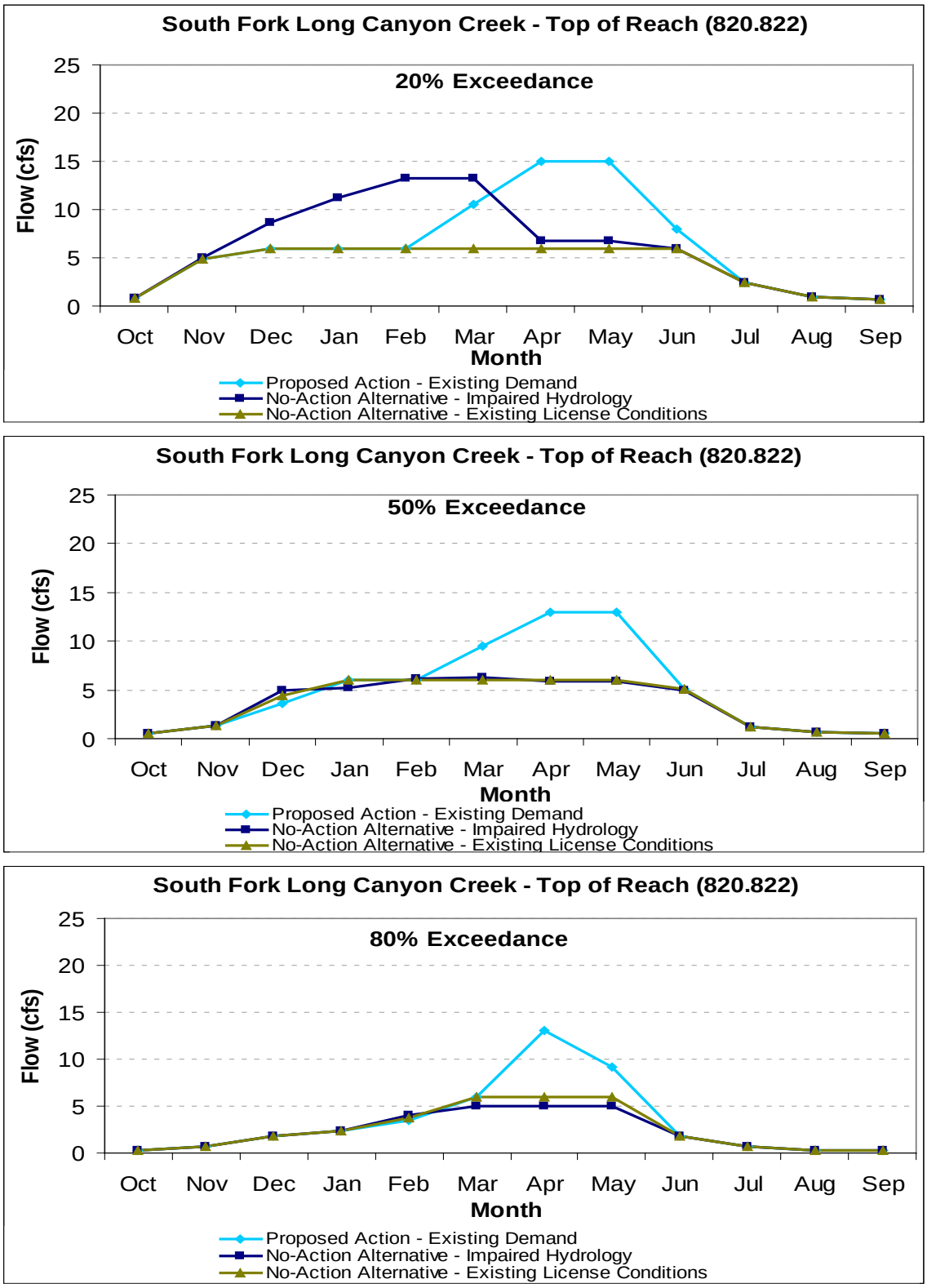


Figure 8.3-2. Graphs of Monthly Exceedance Curves (20%, 50%, and 80%) for Selected Locations in the Small Bypass Reaches (continued).

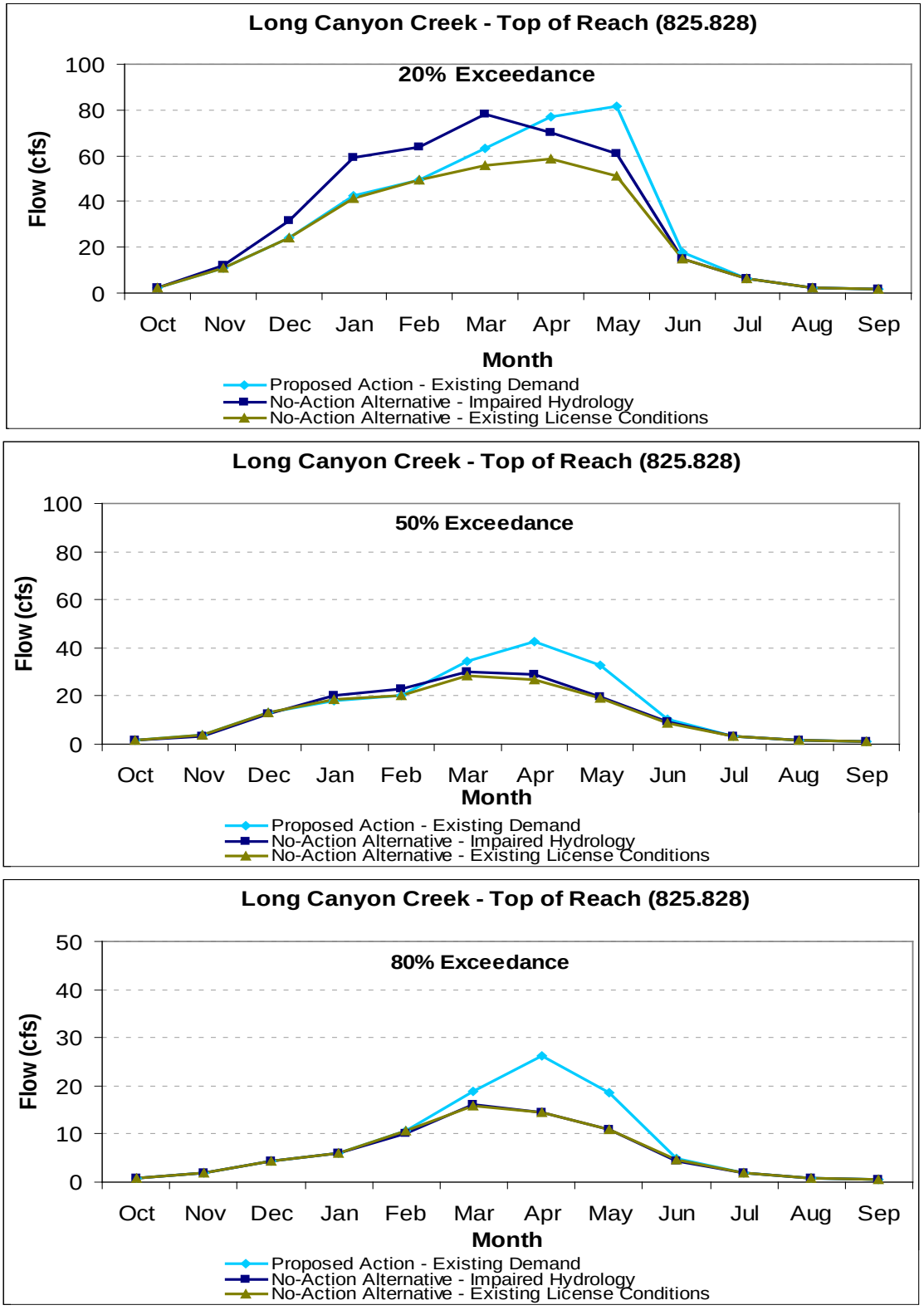


Figure 8.3-2. Graphs of Monthly Exceedance Curves (20%, 50%, and 80%) for Selected Locations in the Small Bypass Reaches (continued).

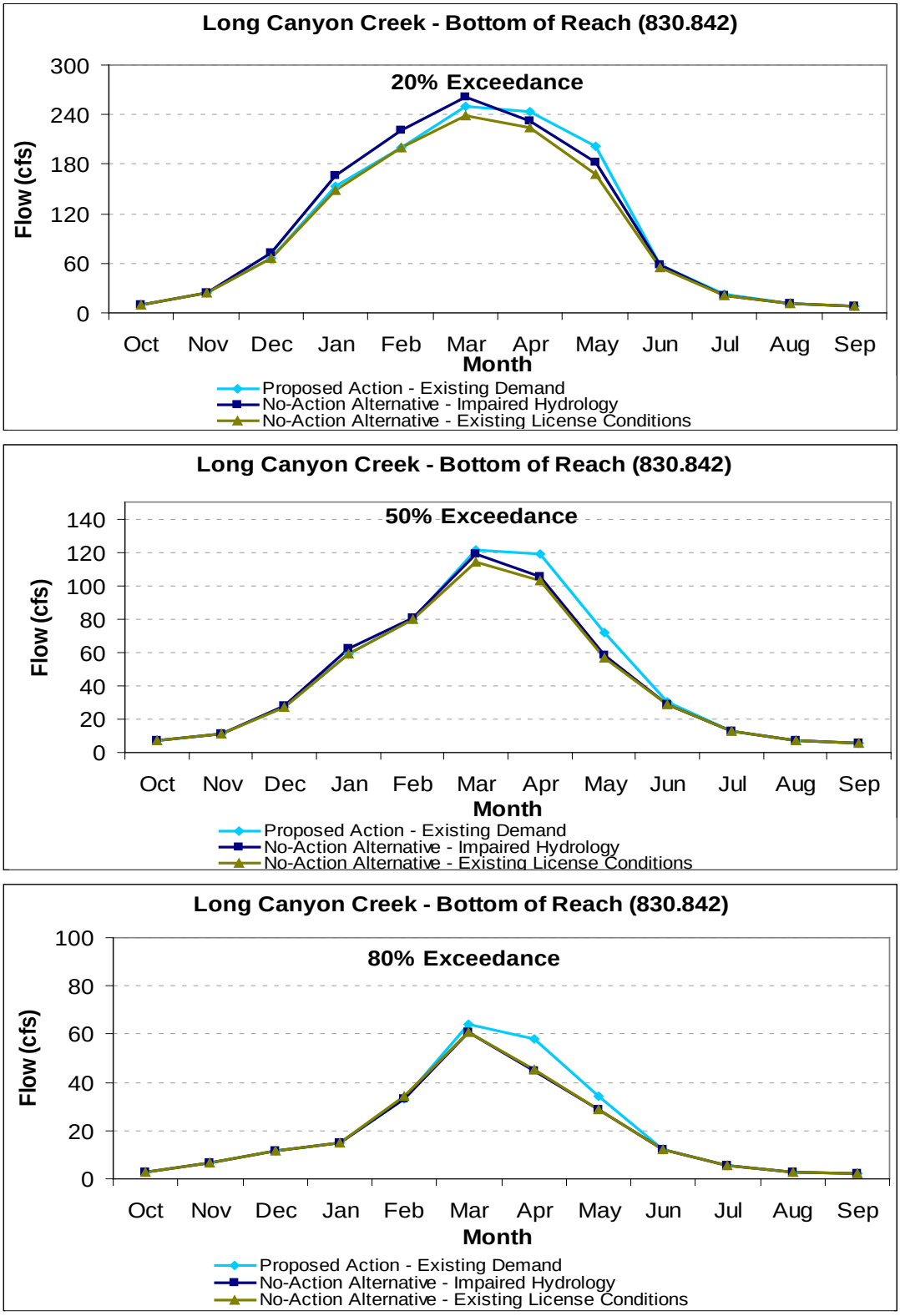


Figure 8.3-3. Graphs of Monthly Exceedance Curves (20%, 50%, and 80%) for MFP Reservoirs.

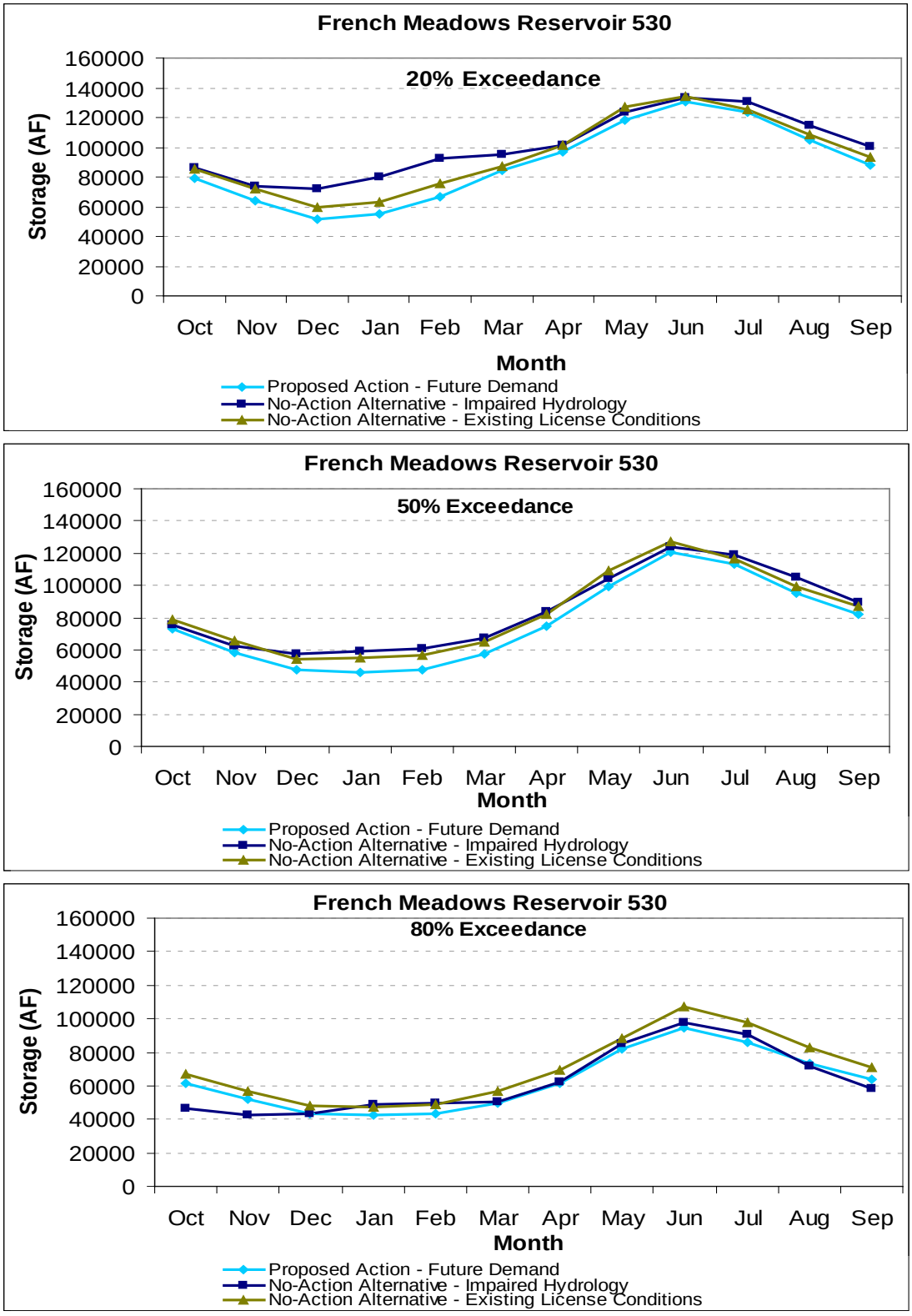


Figure 8.3-3. Graphs of Monthly Exceedance Curves (20%, 50%, and 80%) for MFP Reservoirs (continued).

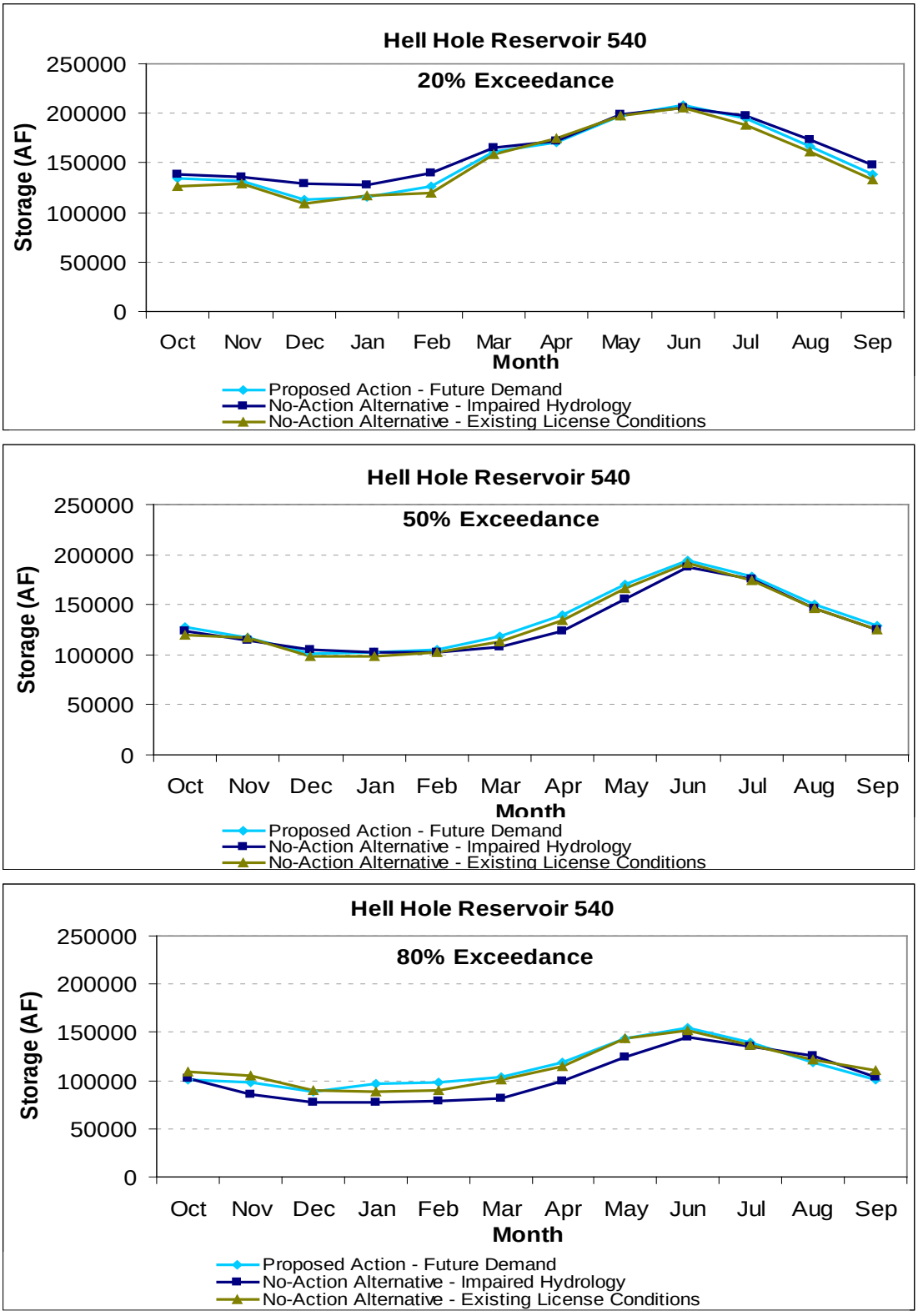


Figure 8.3-4. Graphs of Monthly Exceedance Curves (20%, 50%, and 80%) for MFP Powerhouses.

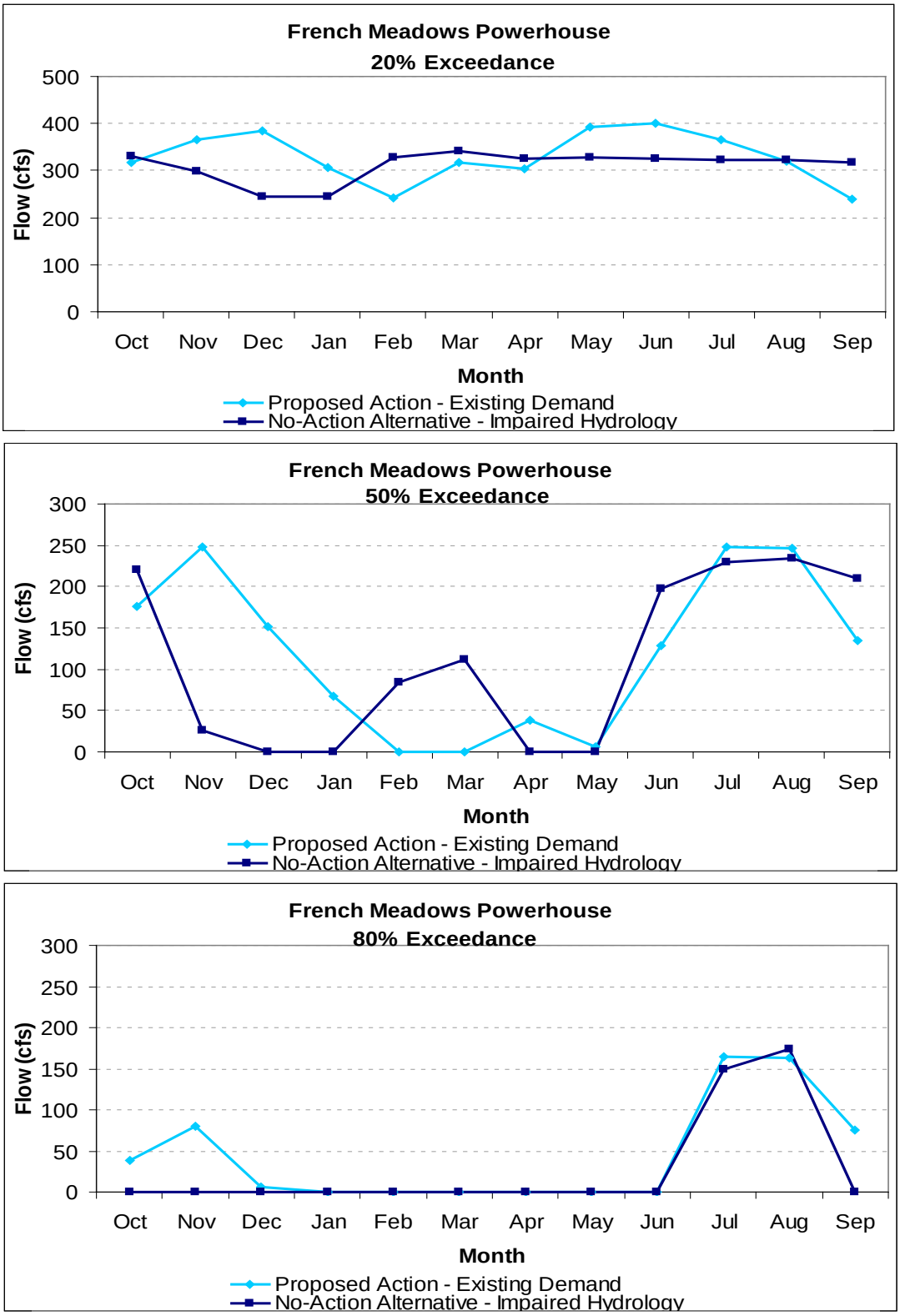


Figure 8.3-4. Graphs of Monthly Exceedance Curves (20%, 50%, and 80%) for MFP Powerhouses (continued).

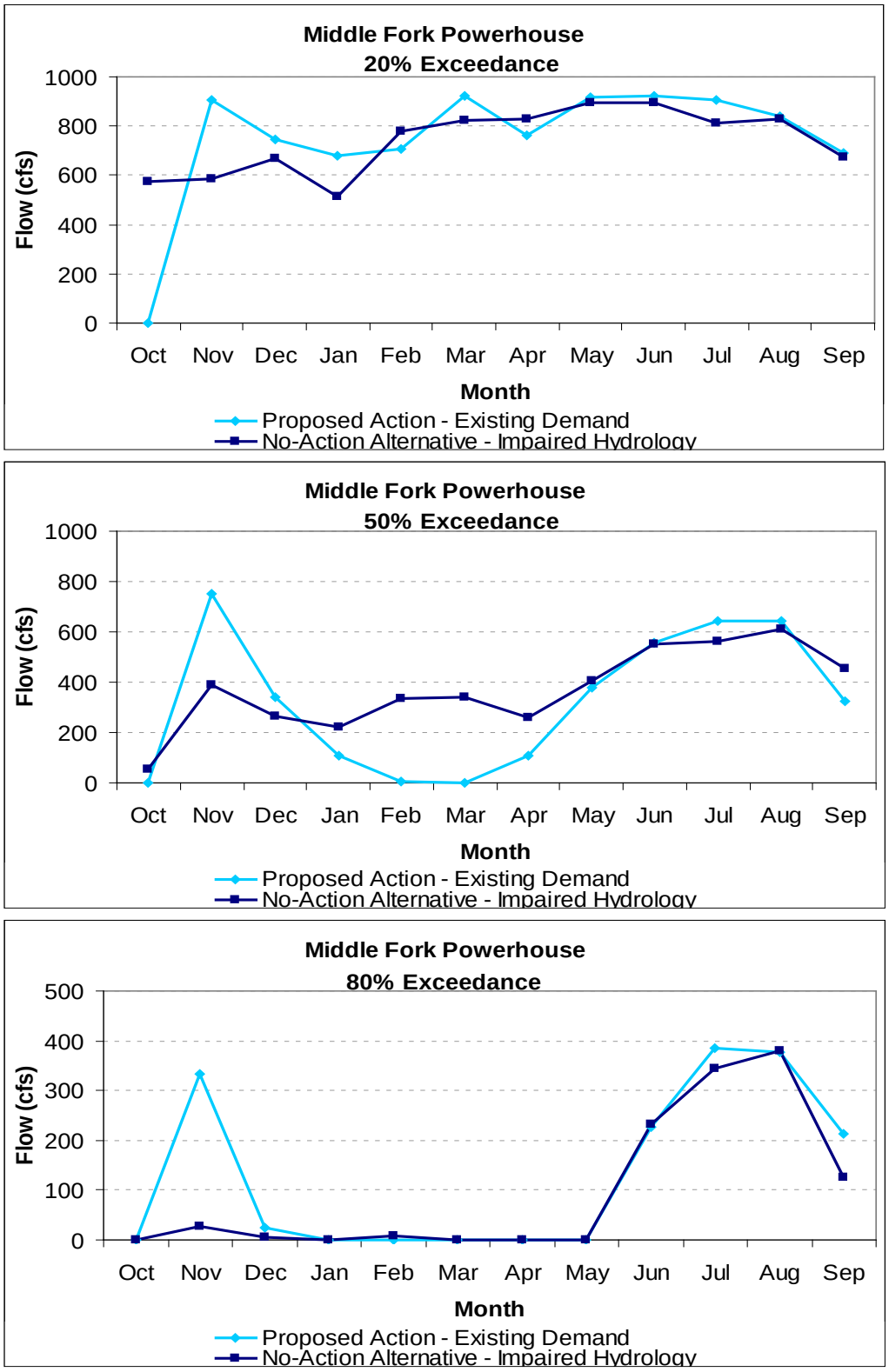


Figure 8.3-4. Graphs of Monthly Exceedance Curves (20%, 50%, and 80%) for MFP Powerhouses (continued).

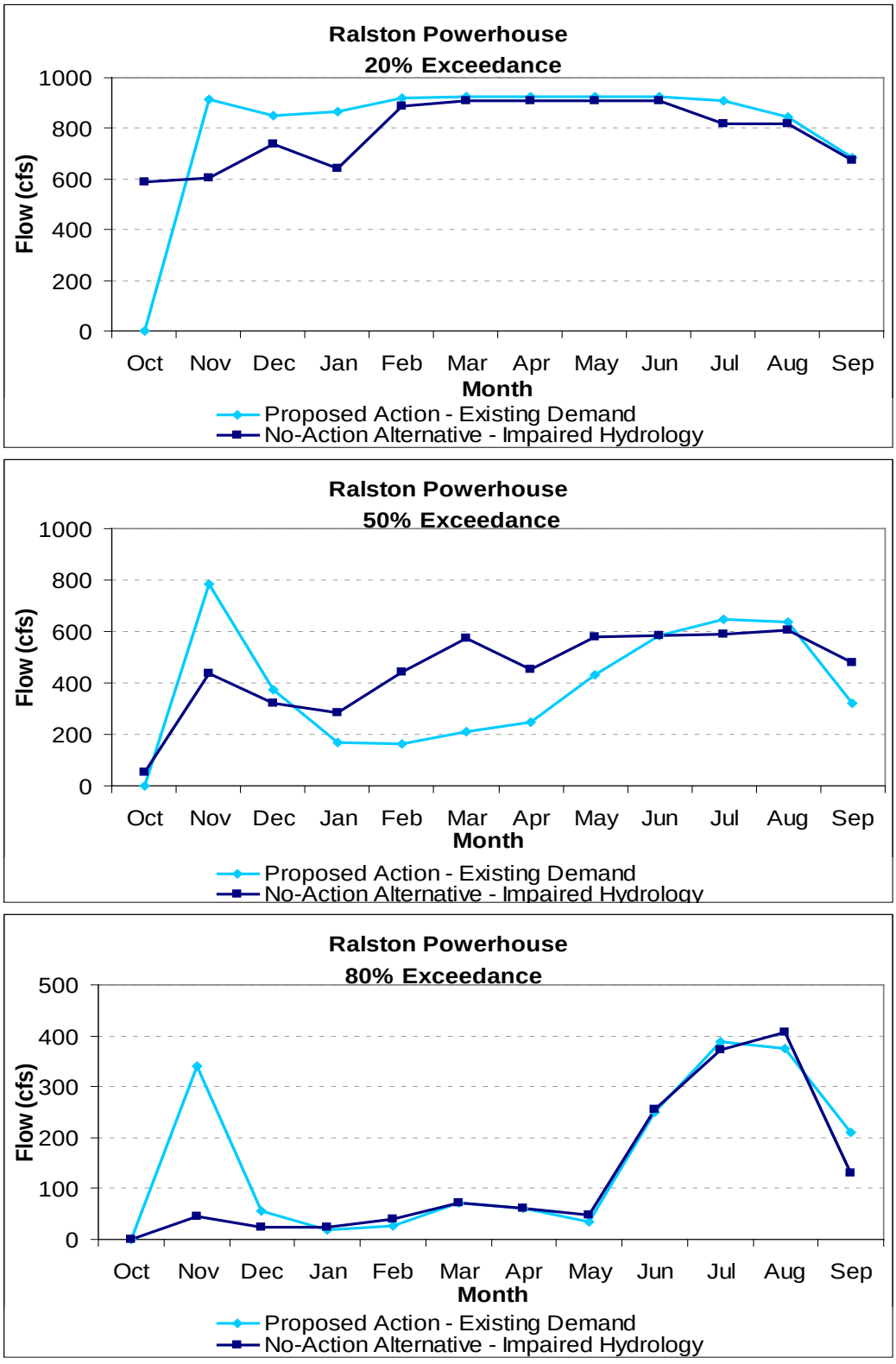


Figure 8.3-4. Graphs of Monthly Exceedance Curves (20%, 50%, and 80%) for MFP Powerhouses (continued).