

**Appendix D6**  
**Estimated Conditions for**  
**Upper Basin Wildlife Refuges**

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# Appendix D6 — Estimated Conditions for Upper Basin Wildlife Refuges

## 1.0 Introduction

The Seedskadee, Browns Park, and Ouray National Wildlife Refuges (NWR), located in the Upper Basin, hold water rights that help to preserve the health of those refuges. The refuges' water rights are typically diversion rights, and the Colorado River Simulation System has the ability to track whether the requested diversion amount is present in reaches approximating the locations of the Upper Basin NWRs. The following sections present the method to estimate the flow conditions for the NWRs and the resulting estimated conditions.

## 2.0 Methodology

Historically, the NWRs' diversions vary annually based on hydrologic conditions, so for each refuge, the estimated conditions vary with hydrologic year type. The estimated diversions were developed based on the NWRs' state water rights and historical diversion records. Approximately 20 years of annual water usage reports from the refuges maintained by the U.S. Fish and Wildlife Service were used to develop the estimated diversions. Monthly diversion records or a total annual diversion amount were reported in the water usage reports, depending on refuge and year. The full record of annual diversion amounts were ranked and then separated by exceedance probability to come up with diversion needs that vary with hydrologic year type. Wet, moderately wet, average, and dry year types were defined as 0 to 10 percent, 10 to 30 percent, 30 to 70 percent, and 70 to 100 percent exceedance probabilities, respectively. The full diversion right was used as the annual need in wet years. For other year types, the annual diversion amount was determined based on the middle exceedance probability for that year type—for example, the year with a 20 percent exceedance probability for the average wet year. Monthly needs were then computed based on the average historical monthly diversion pattern.

## 3.0 Estimated Conditions

The estimated conditions for Seedskadee, Browns Park, and Ouray NWRs are listed in tables D6-1, D6-2, and D6-3, respectively.

TABLE D6-1  
 Estimated Conditions (acre-feet [af] per month) for the Seedskadee NWR

Year Type Exceedance	Dry 100–70%	Average 70–30%	Moderately Wet 30–10%	Wet 10–0%
<b>January</b>	250	300	360	700
<b>February</b>	250	300	360	700
<b>March</b>	1,300	1,700	1,900	3,650
<b>April</b>	1,600	2,000	2,300	4,450
<b>May</b>	2,060	2,550	2,700	5,700
<b>June</b>	1,640	2,040	2,330	4,600
<b>July</b>	900	1,150	1,300	2,500
<b>August</b>	700	850	1,200	2,200
<b>September</b>	850	1,000	1,200	2,200
<b>October</b>	450	570	650	1,300
<b>November</b>	0	0	0	0
<b>December</b>	0	0	0	0
<b>Annual</b>	10,000	12,460	14,300	28,000

TABLE D6-2  
 Estimated Conditions (af per month) for the Browns Park NWR

Year Type Exceedance	Dry 100–70%	Average 70–30%	Moderately Wet 30–10%	Wet 10–0%
<b>January</b>	90	130	200	320
<b>February</b>	90	130	200	310
<b>March</b>	460	680	1,100	1,615
<b>April</b>	560	830	1,300	1,970
<b>May</b>	720	1,070	1,700	2,520
<b>June</b>	570	850	1,340	2,020
<b>July</b>	320	480	750	1,130
<b>August</b>	240	360	570	855
<b>September</b>	220	330	520	800
<b>October</b>	230	340	520	810
<b>November</b>	0	0	0	0
<b>December</b>	0	0	0	0
<b>Annual</b>	3,500	5,200	8,200	12,350

TABLE D6-3  
 Estimated Conditions (af per month) for the Ouray NWR

Year Type Exceedance	Dry 100–70%	Average 70–30%	Moderately Wet 30–10%	Wet 10–0%
<b>January</b>	0	0	0	0
<b>February</b>	0	0	0	0
<b>March</b>	600	1,100	1,500	2,000
<b>April</b>	800	1,200	1,100	2,300
<b>May</b>	2,500	4,500	6,500	8,800
<b>June</b>	800	1,200	1,500	2,200
<b>July</b>	600	1,100	1,500	2,100
<b>August</b>	600	1,100	1,500	2,050
<b>September</b>	600	1,100	1,500	2,000
<b>October</b>	600	1,100	1,500	2,000
<b>November</b>	0	0	0	0
<b>December</b>	0	0	0	0
<b>Annual</b>	7,100	12,400	16,600	23,450