

5.13 TOTAL NATIONAL ECONOMIC DEVELOPMENT (NED) ECONOMICS

Total average annual Missouri River National Economic Development (NED) benefits are the summation of economic benefits for flood control, recreation, water supply, navigation, and hydropower. Because the interior drainage and groundwater analyses are based on representative areas instead of a comprehensive basis and the analyses cover varying time periods, the data from these two analyses are not discussed in this section. A change in the water control plan has positive or negative effects on the individual uses in response to the various changes incorporated in the alternative plans. Detailed technical analyses and discussion of these topics are contained in individual technical reports supplemented by discussions in sections of this document describing impacts to the individual uses. The following summarizes the comparison of total NED benefits for the CWCP and the submitted alternatives.

Table 5.13-1 and Figure 5.13-1 provide total average annual NED benefits for the 100-year period. The table also provides the average annual NED value for each major economic use. Although the emphasis is on change in economic performance of each use, it is useful to note that of the total NED benefits, the largest portion of the benefits is provided by hydropower, followed by water supply, flood control, recreation, and navigation. Tribal benefits are discussed under each of the economic resources and are not accumulated here because Tribal benefits cannot be directly added for all the economic uses.

The CWCP maximizes benefits among the alternatives for navigation and provides only slightly fewer flood control benefits than alternative MLDDA. Total average annual NED benefits for the CWCP are estimated at \$1,853.6 million.

The MLDDA alternative, which sets aside more of the system storage for flood control, maximizes flood control and water supply benefits but provides 0.1 percent fewer average annual total benefits than the CWCP. Compared to the CWCP, the MLDDA alternative increases recreation, flood control, and water supply benefits but provides fewer navigation and hydropower benefits.

The ARNRC alternative, which has greater drought conservation and modified releases and unbalancing of system storage for fish and wildlife, includes a summer low release from Gavins Point Dam that will interrupt navigation. If navigation can continue during the spring and fall, the ARNRC alternative provides 0.2 percent fewer average annual total benefits than the CWCP. Benefits are reduced for navigation, flood control, and water supply but greater for recreation and hydropower due to higher average pool levels. If navigation is essentially extinguished with only local sand and gravel mining and rock placement movements continuing, the ARNRC alternative reduces total NED benefits by 0.4 percent compared to the CWCP.

The MRBA alternative, which increases drought conservation but not as much as the ARNRC alternative, maximizes recreation benefits among the submitted alternatives and provides 0.4 percent greater total average annual benefits than the CWCP. Benefits are greater than the CWCP for

Table 5.13-1. Average annual total NED benefits by resource (\$millions).

	CWCP	MLDDA	ARNRC	MRBA	MODC	BIOP	FWS30
Navigation*	7.0	6.7	4.6	6.9	6.9	4.8	4.5
Recreation	84.7	85.2	87.1	88.0	87.7	86.6	87.7
Flood Control	410.3	410.5	406.7	407.8	407.3	407.2	406.7
Water Supply	610.1	611.4	600.8	610.4	610.1	608.6	608.4
Hydropower	741.5	737.4	750.5	747.1	749.4	755.3	755.5
Total NED*	1853.6	1851.1	1849.7	1860.3	1861.3	1862.4	1862.7
Navigation**	7.0	6.7	0.9	6.9	6.9	1.0	1.0
Total NED**	1853.6	1851.1	1846.0	1860.3	1861.3	1858.6	1859.2

* Includes benefits if navigation continues before and after the split season

** Includes remaining sand/rock benefits if navigation is essentially extinguished.

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recreation, water supply, and hydropower, lower for flood control, and slightly reduced for navigation.

The MODC alternative, which increases drought conservation in the same manner as the MRBA alternative and delays evacuation until mid-September, produces similar economic outputs as the MRBA alternative as might be expected due to their very similar water control features. The primary difference from the MRBA alternative is a \$2.3 million average annual increase in hydropower benefits. Total average annual NED benefits are 0.4 percent greater than the CWCP.

The BIOP and FWS30 alternatives have the same drought conservation measures as the MRBA alternative but also include modified releases and unbalanced system storage for fish and wildlife. Both alternatives produce 0.5 percent greater total average annual NED benefits than the CWCP if navigation is assumed to continue with these alternatives. Hydropower benefits are also maximized with these submitted alternatives.

The FWS30 alternative with a higher spring rise provides slightly greater total, hydropower, and recreation benefits than the BIOP, but lower benefits for navigation, flood control, water supply. If navigation is essentially extinguished, both alternatives exceed the CWCP total NED benefits by 0.3 percent.

Table 5.13-2 compares the average annual total NED benefits for the CWCP and the submitted alternatives during various time periods of the 100-year period of analysis assuming relatively normal navigation can continue during the spring and fall months for the split season alternatives. These data provide insight into the total economic benefits of the alternatives over the full 100-year period, each major drought period, and each period not under the influence of a major drought. In general, total economic NED benefits are lower during drought periods and higher during non-drought periods. Alternatives that have higher benefits during drought periods are not the same alternatives that have highest benefits during the non-drought periods. During drought

Table 5.13-2. Average annual total NED benefits for alternatives with continued navigation (\$millions).

	CWCP	MLDDA	ARNRC	MRBA	MODC	BIOP	FWS30
1898-1929 Non-drought	1,823	1,816	1,807	1,820	1,819	1,820	1,817
1930-1950 Drought	1,727	1,737	1,762	1,764	1,771	1,762	1,775
1951-1953 Non-drought	2,907	2,900	2,883	2,905	2,914	2,907	2,899
1954-1965 Drought	1,745	1,741	1,754	1,752	1,750	1,764	1,762
1966-1987 Non-drought	1,992	1,987	1,973	1,990	1,990	1,989	1,984
1988-1993 Drought	1,506	1,500	1,518	1,509	1,511	1,525	1,524
1994-1997 Non-drought	2,057	2,058	1,981	2,043	2,034	2,051	2,058
Total Non-drought	1,953	1,947	1,931	1,949	1,949	1,949	1,946
Total Drought	1,699	1,701	1,722	1,721	1,724	1,726	1,732
Total Period	1,854	1,851	1,850	1,860	1,861	1,862	1,863
Difference from CWCP	–	(2)	(4)	7	8	9	9
Differences in average annual total NED benefits from CWCP with extinguished navigation (\$millions)							
	CWCP	MLDDA	ARNRC	MRBA	MODC	BIOP	FWS30
1898-1929 Non-drought	–	(7)	(16)	(3)	(3)	(3)	(6)
1930-1950 Drought	–	9	35	37	43	35	47
1951-1953 Non-drought	–	(6)	(23)	(2)	7	0	(8)
1954-1965 Drought	–	(4)	9	7	5	19	17
1966-1987 Non-drought	–	(5)	(19)	(2)	(2)	(3)	(9)
1988-1993 Drought	–	(6)	12	2	4	19	18
1994-1997 Non-drought	–	1	(76)	(14)	(23)	(6)	1
Total Non-drought	–	(6)	(21)	(3)	(4)	(3)	(6)
Total Drought	–	3	23	22	26	28	34
Total Period	–	(2)	(4)	7	8	9	9

periods the FWS30 alternative provides the greatest benefits followed by the BIOP. Overall, for all drought periods and during the 1930 to 1941 drought and subsequent 9-year recovery period, the FWS30 alternative has the highest benefits. In contrast, during the two more recent and shorter extended droughts, the BIOP alternative provides slightly greater benefits than the FWS30 alternative. All the submitted alternatives provide greater benefits than the CWCP during droughts.

The CWCP provides greater total average annual benefits during non-drought periods than any of the submitted alternatives. The ARNRC alternative provides the least total average annual benefit during non-drought periods of the submitted alternatives.

Table 5.13-3 compares total NED benefits for alternatives assuming normal navigation movements essentially cease with a split season. The outputs are the same as the previous table except for the alternatives with a split in the navigation season—the ARNRC, BIOP, and

FWS30 alternatives—which produce reduced drought period and non-drought period average annual navigation and total benefits. Even with this assumption, all the submitted alternatives provide increased benefits relative to the CWCP during drought periods. The FWS30 alternative, one of the split season alternatives, maximizes average annual drought period benefits even assuming navigation is extinguished. Assuming navigation is essentially extinguished reinforces the CWCP as the alternative with the greatest NED benefits for the non-drought periods by reducing benefits for the split season alternatives.

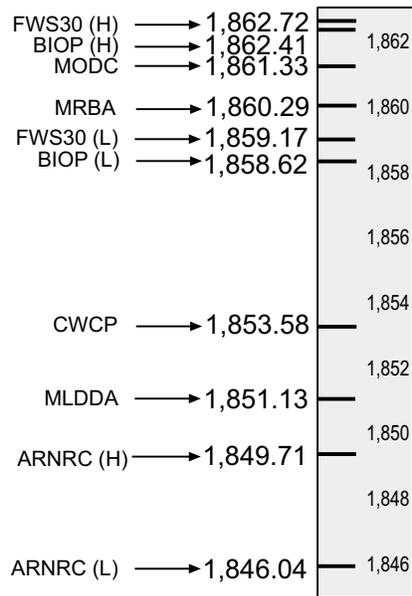
Figure 5.13-2 shows average annual total NED benefits for each of the alternatives over the 100-year period. Split season alternatives are presented both assuming navigation continues and assuming it is extinguished. Very little difference in economic performance of the alternatives can be discerned from the figure for any of the years. Years with benefit spikes generally correspond to years with greater flood control benefits (Figure 5.13-3).

Table 5.13-3. Average annual total NED benefits for alternatives with extinguished navigation (\$millions).

	CWCP	MLDDA	ARNRC	MRBA	MODC	BIOP	FWS30
1898-1929 Non-drought	1,823	1,816	1,803	1,820	1,819	1,815	1,813
1930-1950 Drought	1,727	1,737	1,759	1,764	1,771	1,759	1,772
1951-1953 Non-drought	2,907	2,900	2,879	2,905	2,914	2,903	2,895
1954-1965 Drought	1,745	1,741	1,752	1,752	1,750	1,761	1,759
1966-1987 Non-drought	1,992	1,987	1,969	1,990	1,990	1,985	1,980
1988-1993 Drought	1,506	1,500	1,517	1,509	1,511	1,523	1,522
1994-1997 Non-drought	2,057	2,058	1,977	2,043	2,034	2,047	2,054
Total Non-drought	1,953	1,947	1,927	1,949	1,949	1,945	1,942
Total Drought	1,699	1,701	1,720	1,721	1,724	1,724	1,730
Total Period	1,854	1,851	1,846	1,860	1,861	1,859	1,859
Difference from CWCP	–	(2)	(8)	7	8	5	6
Differences in average annual total NED benefits from CWCP with extinguished navigation (\$millions)							
	CWCP	MLDDA	ARNRC	MRBA	MODC	BIOP	FWS30
1898-1929 Non-drought	–	(7)	(20)	(3)	(3)	(8)	(10)
1930-1950 Drought	–	9	32	37	43	32	45
1951-1953 Non-drought	–	(6)	(28)	(2)	7	(4)	(12)
1954-1965 Drought	–	(4)	7	7	5	16	14
1966-1987 Non-drought	–	(5)	(24)	(2)	(2)	(7)	(12)
1988-1993 Drought	–	(6)	10	2	4	17	16
1994-1997 Non-drought	–	1	(80)	(14)	(23)	(10)	(3)
Total Non-drought	–	(6)	(26)	(3)	(4)	(8)	(11)
Total Drought	–	3	21	22	26	25	31
Total Period	–	(2)	(8)	7	8	5	6

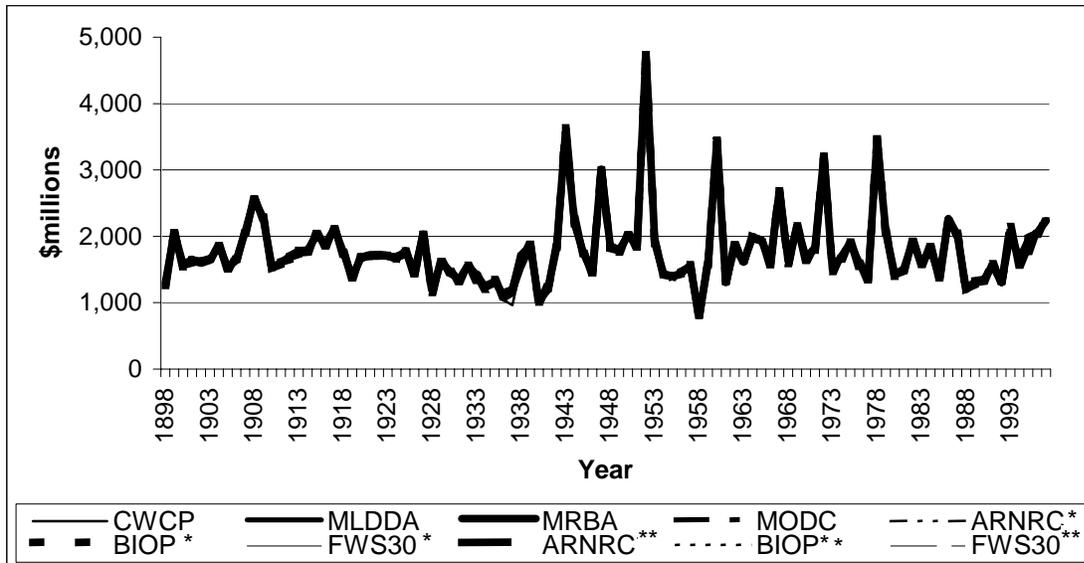
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(H) Includes benefits if navigation continues before and after the split season.
 (L) Includes remaining sand/rock benefits if navigation is essentially extinguished.

Figure 5.13-1. Average annual total NED benefits for submitted alternatives (\$millions).



* Includes benefits if navigation continues before and after the split season.
 ** Includes remaining sand/rock benefits if navigation is essentially extinguished.

Figure 5.13-2. Average annual total NED benefits for submitted alternatives.

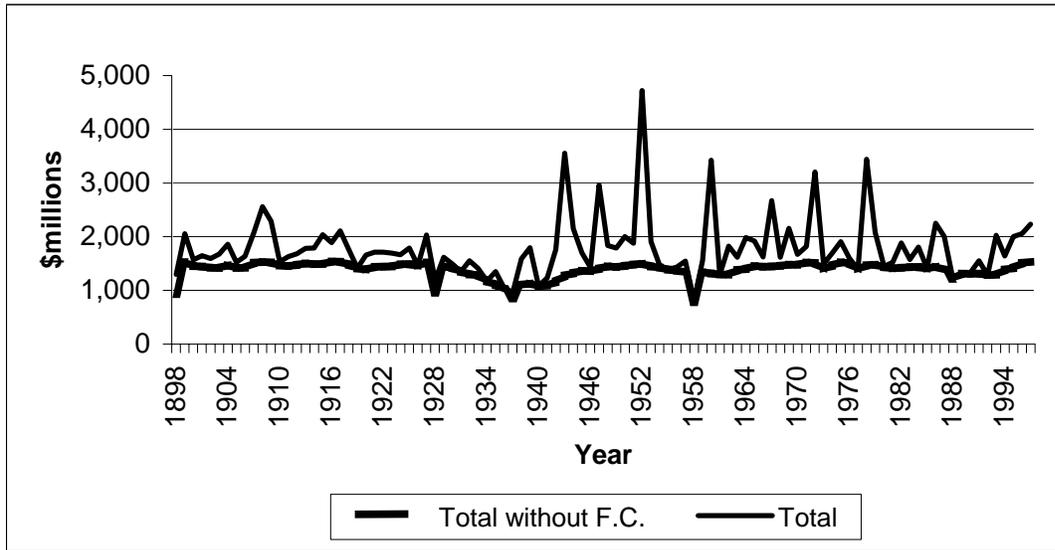


Figure 5.13-3. Average annual total NED benefits for CWCP: total and total without flood control.

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