

7.13 TOTAL NED ECONOMICS

Total average annual Missouri River 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 economic uses in response to the various changes incorporated in the alternatives. 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, the MCP, and the GP options.

Table 7.13-1 provides total average annual NED benefits for the 100-year period and for each major economic use. The CWCP provides fewer total benefits than the MCP or any of the four GP options. Among these alternatives, the CWCP maximizes navigation and flood control benefits.

The MCP, which has the basic increased drought conservation measures and the Fort Peck spring rise included in the GP options, provides an average annual increase of \$7 million, or 0.4 percent in total NED benefits over the CWCP. The increase in benefits provided by the MCP is due primarily to increased hydropower benefits and, to a lesser extent, increased recreation benefits. The higher average lake levels resulting from the increased drought conservation measures positively affect these two uses.

GP1528, the potential starting point for the GP options, maximizes total NED benefits as well as hydropower and water supply benefits. It also has the second highest recreation benefits. Total average annual NED benefits are \$9 million, or 0.5 percent more than the MCP. The GP1528 option decreases navigation benefits by \$1.6 million, or about 23 percent, compared to the MCP.

The GP2021 option introduces both a higher spring rise than the GP1528 option, and summer flows each year below the minimum required for navigation service. All resource category benefits are reduced compared to the GP1528 option, except for flood control. Total NED benefits are reduced by \$7 million, or 0.4 percent relative to GP1528 if it is assumed that navigation can continue in the spring and fall. If it is assumed that this option essentially extinguishes navigation, benefits are reduced by \$11 million, or 0.6 percent, relative to the GP1528 option.

The GP1521 option, which reduces only the summer flows relative to those of the GP1528 option, produces very similar effects on total NED benefits as the GP2021 option. Total benefits are reduced by \$8 million, or 0.4 percent, compared to the GP1528 option if navigation continues when flows permit. If navigation is essentially extinguished, benefits are reduced by \$12 million, or 0.6 percent.

The GP2028 option, which increases only the spring rise relative to the one included in the GP1528 option, produces very nearly identical total average annual NED benefits as the GP1528 option, and benefits are also very nearly the same for all economic resources, including the maximum value

Table 7.13-1. Average annual total NED benefits by resource (\$millions).

| | CWCP | MCP | GP1528 | GP2021 | GP1521 | GP2028 |
|--------------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| Navigation* | 7.0 | 6.9 | 5.3 | 4.7 | 4.8 | 5.3 |
| Recreation | 84.7 | 87.9 | 88.5 | 86.6 | 86.6 | 88.7 |
| Flood Control | 410.3 | 408.0 | 405.8 | 407.7 | 406.3 | 405.4 |
| Water Supply | 610.1 | 610.4 | 611.1 | 608.5 | 608.6 | 611.0 |
| Hydropower | 741.5 | 747.4 | 758.8 | 754.8 | 755.4 | 758.0 |
| Total NED* | 1,853.60 | 1,860.70 | 1,869.50 | 1,862.40 | 1,861.70 | 1,868.30 |
| Navigation** | 7.0 | 6.9 | 5.3 | 1.0 | 1.0 | 5.3 |
| Total NED** | 1,853.60 | 1,860.70 | 1,869.50 | 1,858.70 | 1,857.90 | 1,868.30 |

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

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

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for recreation. Relative to the GP1528 option, the GP2028 option provides \$1 million or 0.1 percent, fewer benefits.

Tables 7.13-2 and 7.13-3 compare the total NED benefits for the CWCP versus the MCP and the GP options 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 (the GP2021 and GP1521 options). These data provide insight into the total economic benefits of the alternatives over the full 100-year period, each major drought and recovery period, and each period not under the influence of a major drought. In general, total NED benefits are lower during drought periods and higher during non-drought periods.

The MCP and the GP options all provide increased benefits during drought periods compared to the CWCP. During drought periods the MCP increases benefits by \$22 million, or 1.3 percent.

The GP1528 option increases total drought period benefits by an additional \$17 million, or 1.0 percent, above the MCP. The GP2028 option provides essentially the same drought period benefits as GP1528. GP1528 and GP2028 provide the highest total NED benefits during droughts.

The GP2021 and GP1521 options reduce drought period benefits by about \$12 million, or 0.7 percent compared to the GP1528 option. During the 1987 to 1993 drought, the GP2021 and GP1521 options provide the greatest total economic benefit. Ironically, the higher benefits during this drought for these two options are likely due in part to the greater flood control benefits provided by these alternatives during the great flood of 1993.

All alternatives provide nearly the same total average annual benefits during non-drought periods, with the variation from minimum to maximum equaling about \$5 million of a total

Table 7.13-2. Average annual total NED benefits for alternatives with continuing navigation (\$millions).

| | | CWCP | MCP | GP1528 | GP2021 | GP1521 | GP2028 |
|--------------------------|-------------|--------------|--------------|--------------|--------------|--------------|--------------|
| 1898-1929 | Non-drought | 1,823 | 1,821 | 1,823 | 1,819 | 1,820 | 1,822 |
| 1930-1950 | Drought | 1,727 | 1,764 | 1,783 | 1,761 | 1,761 | 1,783 |
| 1951-1953 | Non-drought | 2,907 | 2,906 | 2,911 | 2,908 | 2,910 | 2,906 |
| 1954-1965 | Drought | 1,745 | 1,752 | 1,770 | 1,763 | 1,763 | 1,770 |
| 1966-1987 | Non-drought | 1,992 | 1,990 | 1,995 | 1,989 | 1,988 | 1,991 |
| 1988-1993 | Drought | 1,506 | 1,508 | 1,518 | 1,527 | 1,527 | 1,518 |
| 1994-1997 | Non-drought | 2,057 | 2,048 | 2,049 | 2,061 | 2,042 | 2,054 |
| Total Non-drought | | 1,953 | 1,950 | 1,953 | 1,950 | 1,949 | 1,952 |
| Total Drought | | 1,699 | 1,721 | 1,738 | 1,726 | 1,726 | 1,738 |
| Total Period | | 1,854 | 1,861 | 1,869 | 1,862 | 1,862 | 1,868 |
| Difference from CWCP | | | 7 | 16 | 9 | 8 | 15 |

Table 7.13-3. Differences in average annual total NED benefits from CWCP (\$millions).

| | | MCP | GP1528 | GP2021 | GP1521 | GP2028 |
|--------------------------|-------------|-----------|-----------|-----------|-----------|-----------|
| 1898-1929 | Non-drought | -2 | 0 | -4 | -3 | -1 |
| 1930-1950 | Drought | 37 | 56 | 34 | 34 | 55 |
| 1951-1953 | Non-drought | 0 | 5 | 2 | 3 | -1 |
| 1954-1965 | Drought | 7 | 25 | 18 | 18 | 25 |
| 1966-1987 | Non-drought | -2 | 3 | -4 | -5 | -1 |
| 1988-1993 | Drought | 2 | 12 | 21 | 20 | 12 |
| 1994-1997 | Non-drought | -9 | -8 | 4 | -15 | -3 |
| Total Non-drought | | -3 | 1 | -3 | -4 | -1 |
| Total Drought | | 22 | 40 | 27 | 27 | 39 |
| Total Period | | 7 | 16 | 9 | 8 | 15 |

average annual benefit during non-drought periods of \$1,950 million. During non-drought periods, only the GP1528 option provides slightly greater benefits than the CWCP.

Tables 7.13-4 and 7.13-5 compare total NED benefits for the alternatives assuming normal navigation movements essentially cease with the two split season GP options. With this assumption, the differences occur for the options that include a split navigation season, GP1521 and GP2021.

Under this navigation assumption, the GP1521 and GP2021 options provide about \$15 million, or 0.9 percent fewer average annual total NED benefits

during drought periods than the GP1528 option and about \$8 to 9 million, or 0.4 percent fewer benefits during non-drought periods.

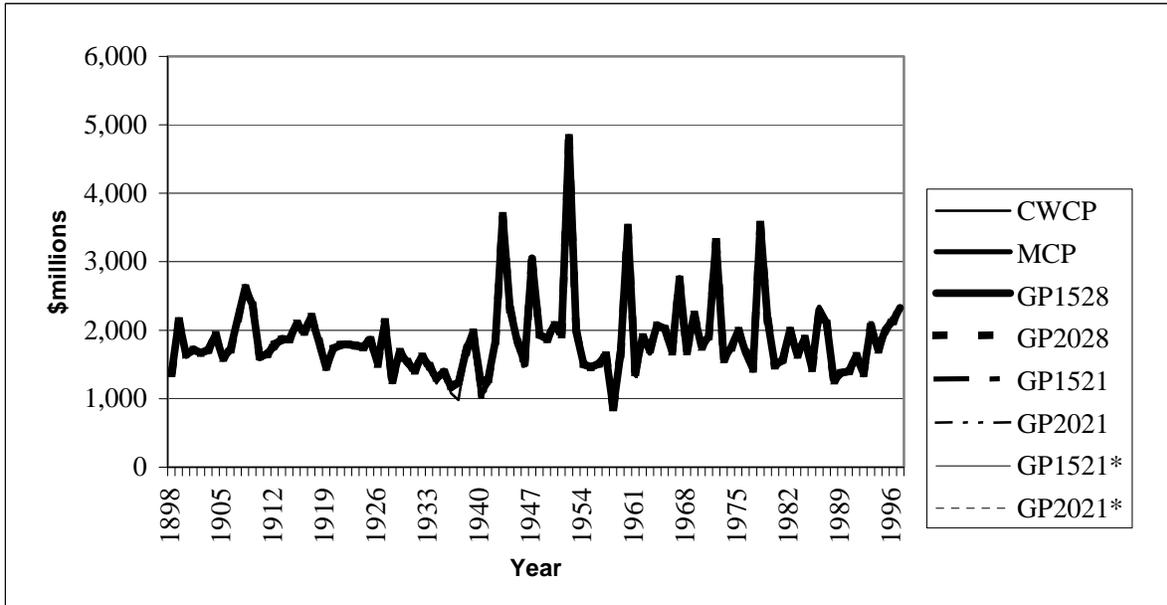
Figure 7.13-1 provides a graphical presentation for each of the alternatives over the 100-year period. The GP1521 and GP2021 options are presented assuming continuing navigation and also assuming navigation is essentially extinguished. Very little difference in economic performance of the alternatives can be discerned from the figure for any of the years. Years with benefit spikes generally correspond to years with greater flood control benefits as illustrated by Figure 7.13-2 for alternative GP1528.

Table 7.13-4. Average annual total NED benefits for alternatives with extinguished navigation (\$millions).

| | | CWCP | MCP | GP1528 | GP2021 | GP1521 | GP2028 |
|--------------------------|-------------|--------------|--------------|--------------|--------------|--------------|--------------|
| 1898-1929 | Non-drought | 1,823 | 1,821 | 1,823 | 1,815 | 1,816 | 1,822 |
| 1930-1950 | Drought | 1,727 | 1,764 | 1,783 | 1,758 | 1,759 | 1,783 |
| 1951-1953 | Non-drought | 2,907 | 2,906 | 2,911 | 2,904 | 2,905 | 2,906 |
| 1954-1965 | Drought | 1,745 | 1,752 | 1,770 | 1,760 | 1,760 | 1,770 |
| 1966-1987 | Non-drought | 1,992 | 1,990 | 1,995 | 1,984 | 1,983 | 1,991 |
| 1988-1993 | Drought | 1,506 | 1,508 | 1,518 | 1,525 | 1,525 | 1,518 |
| 1994-1997 | Non-drought | 2,057 | 2,048 | 2,049 | 2,056 | 2,037 | 2,054 |
| Total Non-drought | | 1,953 | 1,950 | 1,953 | 1,945 | 1,944 | 1,952 |
| Total Drought | | 1,699 | 1,721 | 1,738 | 1,723 | 1,723 | 1,738 |
| Total Period | | 1,854 | 1,861 | 1,869 | 1,859 | 1,858 | 1,868 |
| Difference from CWCP | | - | 7 | 16 | 5 | 4 | 15 |

Table 7.13-5. Differences in average annual total NED benefits from CWCP with extinguished navigation (\$millions).

| | | MCP | GP1528 | GP2021 | GP1521 | GP2028 |
|--------------------------|-------------|-----------|-----------|-----------|-----------|-----------|
| 1898-1929 | Non-drought | -2 | 0 | -8 | -7 | -1 |
| 1930-1950 | Drought | 37 | 56 | 31 | 31 | 55 |
| 1951-1953 | Non-drought | 0 | 5 | -3 | -1 | -1 |
| 1954-1965 | Drought | 7 | 25 | 15 | 15 | 25 |
| 1966-1987 | Non-drought | -2 | 3 | -8 | -9 | -1 |
| 1988-1993 | Drought | 2 | 12 | 19 | 18 | 12 |
| 1994-1997 | Non-drought | -9 | -8 | -1 | -20 | -3 |
| Total Non-drought | | -3 | 1 | -7 | -8 | -1 |
| Total Drought | | 22 | 40 | 24 | 24 | 39 |
| Total Period | | 7 | 16 | 5 | 4 | 15 |



Note: *Assumes navigation is essentially extinguished.

Figure 7.13-1. Average annual total NED benefits for alternatives.

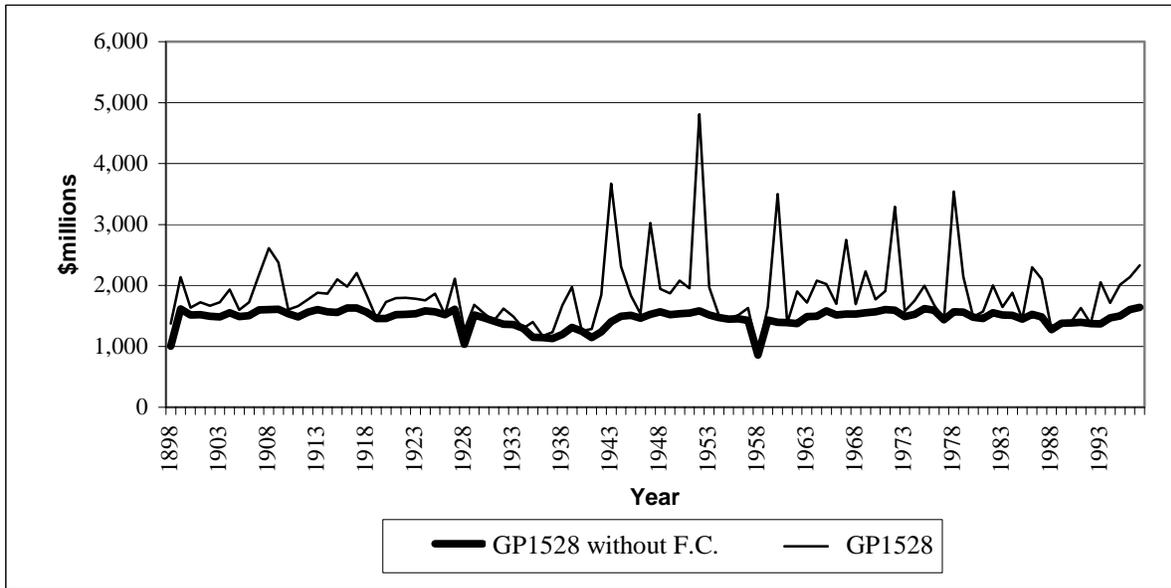


Figure 7.13-2. Average annual total NED benefits for the GP1528 option: total and total without flood control.