7.5 (a) $400,000 annual income to local businesses because of tourism created by new national park - benefit
(b) Cost of fish from hatchery to stock lake at state park - cost
(c) Less tire wear because of smoother road surface - benefit
(d) Decrease in property values due to closure of gov’t research lab - disbenefit
(e) School overcrowding because of military base expansion - disbenefit
(f) Additional revenue to local motels because of extended national park season – benefit

7.8 The salvage value placed in the denominator because it is a recovery of cost, which is a consequence to the government.

7.10 B = $285,000
  C = 12,000,000(A/P, 6%, 40) + 1,100,000
  = 12,000,000(0.06646) + 1,100,000
  = 797,520 + 1,100,000
  = $1,897,520

  B/C = 285,000/1,897,520
  = 0.15

7.14 (a) B = $340,000
  D = $40,000
  C = 2,300,000(0.06) + 120,000
  = $258,000

  B/C = (340,000 – 40,000)/258,000
  = 1.16

  (b) Modified B/C = (340,000 – 40,000 – 120,000)/138,000
  = 1.30
7.15 Use present worth, since most of the cash flows are already present dollars.

(a) Conventional B/C ratio:

\[ B = 200,000 + 100,000(P/A,6\%,40) \]
\[ = 200,000 + 100,000(15.0463) \]
\[ = 200,000 + 1,504,630 \]
\[ D = 18,000(P/A,6\%,40) \]
\[ = 18,000(15.0463) \]
\[ = 270,833 \]
\[ C = 1,200,000 + 200,000(P/F,6\%,3) \]
\[ = 1,200,000 + 200,000(0.8396) \]
\[ = 1,200,000 + 167,920 \]
\[ = 1,367,920 \]
\[ S = 90,000(P/F,6\%,5) \]
\[ = 90,000(0.7473) \]
\[ = 67,257 \]

\[ B/C = (1,704,630 - 270,833)/(1,367,920 - 67,257) \]
\[ = 1.10 \]

(b) Modified B/C ratio = \((B - D + S)/C\)

\[ = (1,704,630 - 270,833 + 67,257)/1,367,920 \]
\[ = 1.10 \]

7.22 Compare EC vs DN:

\[ B = $110,000 \text{ per year} \]
\[ D = $26,000 \text{ per year} \]
\[ C = 38,000(A/P,7\%,10) + 49,000 \]
\[ = 38,000(0.14238) + 49,000 \]
\[ = 38,410 \]

\[ B/C = (110,000 - 26,000)/38,410 \]
\[ = 1.54 \]
Eliminate DN

Compare EC vs NS:

Incremental B = 160,000 – 110,000
\[ = 50,000 \]
Incremental D = 0 – 26,000
\[ = -26,000 \]

Cost EC = $54,410 (from above)
Cost NS = 87,000(A/P,7\%,10) + 64,000
\[ = 87,000(0.14238) + 64,000 \]
\[ = 76,387 \]
Incremental $C = 76,387 - 54,410$
   $= 21,977$

Incremental $B/C = \frac{[50,000 - (-26,000)]}{21,977}$
   $= 3.46$  
   Eliminate EC

Select alternative NS.

7.31  Rank alternatives according to increasing cost: DN, X, Y, Z, ZZ

Eliminate X based on $B/C$ vs DN $= .75 < 1.0$

Y vs DN $= 1.07$  
   Delta $B/C = 1.07$  
   Eliminate DN

Y vs Z $= 1.40$  
   Delta $B/C = 1.40$  
   Eliminate Y

Z vs ZZ $= 1.00$  
   Delta $B/C = 1.00$  
   ZZ is larger cost  
   Eliminate Z

Select alternative ZZ