The discount rate is determined by OMB Guidance and is NOT a user-defined parameter.

A detailed review of the economic theory about discount rates is beyond the scope of this manual. However, the proper discount rate for benefit-cost analysis is a "real" discount rate separate from any assumptions about inflation. For a detailed discussion, see: **A Benefit-Cost Model for the Seismic Rehabilitation of Federal Buildings**, Volume 2, Chapter 3, Discount Rates and Multipliers, FEMA, 1994.

Project Useful Life

PURPLE Block (Carry Over). The **Project Useful Life**, entered on the **LEVEL ONE (Minimum Data)** screen, is carried over for reference.

Present Value Coefficient

YELLOW Block (Result). The **Present Value Coefficient** is mathematically determined by the discount rate and the project useful lifetime. The **Present Value Coefficient** is the present value of $1.00 per year in benefits received over the project useful lifetime. In other words, the **Present Value Coefficient** is a multiplier of the expected annual benefits which determines the net present value of the expected annual benefits.

Calculated benefits and benefit-cost ratios are directly proportional to the **Present Value Coefficient**. However, in every case the discount rate and project useful lifetime entered by a user **MUST** be commensurate with the actual funding source for the project (see **Discount Rate**, page 9-8) and the actual mitigation project (see **Project Useful Life**, page 6-15).

The following table shows the **Present Value Coefficient** for a wide range of discount rates and project useful lifetimes.

PRESENT VALUE COEFFICIENTS

	DISCOUNT RATE									
	0%	1%	2%	3%	4%	5%	6%	7%	8%	9%	10%
YEARS											
1	1.00	0.99	0.98	0.97	0.96	0.95	0.94	0.93	0.93	0.92	0.91
2	2.00	1.97	1.94	1.91	1.89	1.86	1.83	1.81	1.78	1.76	1.74
3	3.00	2.94	2.88	2.83	2.78	2.72	2.67	2.62	2.58	2.53	2.49
4	4.00	3.90	3.81	3.72	3.63	3.55	3.47	3.39	3.31	3.24	3.17
5	5.00	4.85	4.71	4.58	4.45	4.33	4.21	4.10	3.99	3.89	3.79
6	6.00	5.80	5.60	5.42	5.24	5.08	4.92	4.77	4.62	4.49	4.36
7	7.00	6.73	6.47	6.23	6.00	5.79	5.58	5.39	5.21	5.03	4.87
8	8.00	7.65	7.33	7.02	6.73	6.46	6.21	5.97	5.75	5.53	5.33
9	9.00	8.57	8.16	7.79	7.44	7.11	6.80	6.52	6.25	6.00	5.76
10	10.00	9.47	8.98	8.53	8.11	7.72	7.36	7.02	6.71	6.42	6.14
15	15.00	13.87	12.85	11.94	11.12	10.38	9.71	9.11	8.56	8.06	7.61
20	20.00	18.05	16.35	14.88	13.59	12.46	11.47	10.59	9.82	9.13	8.51
25	25.00	22.02	19.52	17.41	15.62	14.09	12.78	11.65	10.67	9.82	9.08
30	30.00	25.81	22.40	19.60	17.29	15.37	13.76	12.41	11.26	10.27	9.43
40	40.00	32.83	27.36	23.11	19.79	17.16	15.05	13.33	11.92	10.76	9.78
50	50.00	39.20	31.42	25.73	21.48	18.26	15.76	13.80	12.23	10.96	9.91
60	60.00	44.96	34.76	27.68	22.62	18.93	16.16	14.04	12.38	11.05	9.97
70	70.00	50.17	37.50	29.12	23.39	19.34	16.38	14.16	12.44	11.08	9.99
80	80.00	54.89	39.74	30.20	23.92	19.60	16.51	14.22	12.47	11.10	10.00
90	90.00	59.16	41.59	31.00	24.27	19.75	16.58	14.25	12.49	11.11	10.00
100	100.00	63.03	43.10	31.60	24.50	19.85	16.62	14.27	12.49	11.11	10.00
1000	1000.00	100.00	50.00	33.33	25.00	20.00	16.67	14.29	12.50	11.11	10.00

SUMMARY OF EXPECTED ANNUAL DAMAGES AND BENEFITS

Summary of Expected Annual Damages and Benefits Table

	Expected Annual Damages Before Mitigation	Expected Annual Damages After Mitigation	Expected Annual Benefits	Present Value of Annual Benefits
Building Damages	$8,100	$12	$8,088	$85,689
Contents Damages	$3,645	$5	$3,640	$38,559
Displacement Costs	$984	$7	$978	$10,358
Business Income Lost	$540	$1	$539	$5,710
Rental Income Lost	$246	$2	$244	$2,590
Gov't Services Lost	$11,163	$13	$11,149	$118,118
Total Losses	$24,678	$39	$24,639	$261,023

YELLOW Blocks (Results). There are five columns in the **Summary of Damages and Losses** table. The first column contains the six types of damages and losses considered, along with a total. The second column is the **Expected Annual Damages and Losses Before Mitigation**. The third column is the **Expected Annual Damages and Losses After Mitigation**. The fourth column is the **Expected Annual Benefits**. The fifth column is the **Present Value of Annual Benefits**.

Expected Annual Damages and Losses Before Mitigation

The **Expected Annual Damages and Losses Before Mitigation** indicate the estimated average annual damages that are expected to occur before the mitigation project is completed. These figures indicate the vulnerability of the existing building to flood damages. See page 9-3 for more discussion.

Expected Annual Damages and Losses After Mitigation

The **Expected Annual Damages and Losses After Mitigation** are the expected annual residual damages after completion of the mitigation project. In some cases, these damages and losses will be zero (e.g., for buyout or relocation projects). See page 9-5 for more discussion.

Expected Annual Benefits

The **Expected Annual Benefits** of the mitigation project are the **Expected Annual Avoided Damages**. The **Benefits** of the mitigation project are exactly the amount of damages and losses which do not occur (i.e., are avoided) because of the mitigation measure. Thus, **Expected Annual Benefits** are the difference between **Expected Annual Damages Before Mitigation** and **Expected Annual Damages After Mitigation**. See page 9-7 for more discussion of the calculation of **Expected Annual Benefits**.

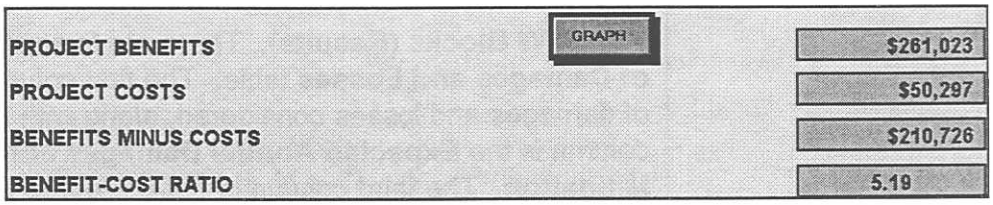
Present Value of Annual Benefits

The **Benefits** are the present value (over the lifetime of the mitigation project under evaluation) of the **Expected Annual Benefits** or, equivalently, the present value of damages avoided. The last column of the **Summary of Expected Annual Damages and Benefits Table** shows the **Benefits** (present value of damages avoided) for each of the six categories of damages and losses and in total.

The final section of the **Benefit-Cost Results** page summarizes the results of the benefit-cost analysis.

SUMMARY OF PROJECT BENEFITS AND COSTS

Project Benefits and Project Costs



PROJECT BENEFITS

YELLOW Block (Result). The **Project Benefits**, which were calculated and displayed as the last entry in the bottom right corner of the **Summary of Expected Annual Damages and Benefits Table**, are presented again here. **Project Benefits** (i.e., the net present value of the **Expected Annual Benefits** over the lifetime of the project) are the product of the **Present Value Coefficient** and the **Expected Annual Benefits**.

PROJECT COSTS

YELLOW Block (Result). The **Project Costs** are carried over from the **LEVEL ONE Data** entry page, where they were entered, for comparison to the calculated **Project Benefits**.

BENEFITS MINUS COSTS

YELLOW Block (Result). The difference between **Project Benefits** and **Project Costs** is displayed here in dollars. This value, also known as the present value criterion, shows the magnitude of the difference between **Benefits** and **Costs**. The present value criterion may be greater than zero (if benefits exceed costs) or less than zero (if costs exceed benefits).

BENEFIT-COST RATIO

YELLOW Block (Result). The **Benefit-Cost Ratio** is the **Project Benefits** divided by the **Project Costs**. For hazard mitigation projects under either Section 404 or Section 406, the **Benefit-Cost Ratio** MUST be equal to or greater than one for funding eligibility.