

Project Summary

Mitigation Title	Hazard	Benefits (B)	Costs (C)	BCR (B/C)
Other @ 40.9074200; -124.0634000	FHA - Severe Storm	\$84,280,547	\$2,081,612	40.49
	Total	\$84,280,547	\$2,081,612	40.49

Property Configuration

Property Title:	Other @ 40.9074200; -124.0634000
Property Location:	95521, Humboldt, California
Property Coordinates:	40.9074200, -124.0634000
Hazard Type:	Severe Storm
Mitigation Action Type:	Other
Property Type:	Utilities
Analysis Method Type:	Historical Damages

Cost Estimation

Other @ 40.9074200; -124.0634000

Project Useful Life (years):	19
Project Cost:	\$2,071,276
Number of Maintenance Years:	19 Use Default: Yes
Annual Maintenance Cost:	\$1,000

Comments

Project Useful Life:	FEMA standard useful like for generators was used.
Mitigation Project Cost:	For cost estimate details, see section .08 Cost Estimate spreadsheet and cost estimate narrative.
Annual Maintenance Cost:	Maintenance costs include fuel, testing and oil changes for the generator.

**Damage Analysis Parameters -
Damage Frequency Assessment**

Other @ 40.9074200; -124.0634000

Year of Analysis Conducted:	2021
Year Property was Built:	2001
Analysis Duration:	10 Use Default: No

Utilities Properties

Other @ 40.9074200; -124.0634000

Type of Service:	Potable Water
Number of Customers Served:	88,000
Value of Unit of Service (\$/person/day):	\$105 Use Default: Yes

Historical Damages Before Mitigation										
Other @ 40.9074200; -124.0634000										
Damage Year	Recurrence Interval (years)	Potable Water	Optional Damages			Volunteer Costs		Total		
		Impact (days)	Category 1 (\$)	Category 2 (\$)	Category 3 (\$)	Number of Volunteers	Number of Days	Damages (\$)	Current Dollars?	Inflated Damages (\$)
2019	12.15	2.83	0	0	0	0	0	28,390,560	No	28,390,560
2019	5.5	1.96	0	0	0	0	0	19,662,720	No	19,662,720
2019	2.8	0.96	0	0	0	0	0	9,630,720	No	9,630,720
2019	3.7	1.25	0	0	0	0	0	12,540,000	No	12,540,000
2018	1.4	0.13	0	0	0	0	0	1,304,160	No	1,304,160
2018	2.2	0.5	0	0	0	0	0	5,016,000	No	5,016,000
2015	1.2	0.04	0	0	0	0	0	401,280	No	401,280
2014	1.8	0.35	0	0	0	0	0	3,511,200	No	3,511,200
2012	1.6	0.25	0	0	0	0	0	2,508,000	No	2,508,000

Comments
 Data from the past 10 years was entered. From each major power included, 5 hours was subtracted, as the facility feels they are able to "limp along" without a meter or two during typical operations. Beyond approximately 5 hours, they would not be able to distribute potable water meeting quality standards. Any power outages 5 hours or less in duration were not included in the analysis. Recurrence intervals were generated based on these outages, through the model's "View Annualized Results" button, and were then input back into the Historical Damages for clarity.

Damages Before Mitigation:

Annualized Damages Before Mitigation		
Other @ 40.9074200; -124.0634000		
Annualized Recurrence Interval (years)	Damages and Losses (\$)	Annualized Damages and Losses (\$)
1.2	401,280	86,121
1.4	1,304,160	161,477
1.6	2,508,000	206,077
1.8	3,511,200	423,908
2.2	5,016,000	676,984
2.8	9,630,720	954,687
3.7	12,540,000	1,388,925
5.5	19,662,720	2,351,210
12.15	28,390,560	2,336,669

Expected Damages After Mitigation							
Other @ 40.9074200; -124.0634000							
Recurrence Interval (years)	Potable Water	Optional Damages			Volunteer Costs		Total
	Impact (days)	Category 1 (\$)	Category 2 (\$)	Category 3 (\$)	Number of Volunteers	Number of Days	Damages (\$)
1.2	0	0	0	0	0	0	0
1.4	0.01	0	0	0	0	0	100,320
1.6	0.01	0	0	0	0	0	100,320
1.8	0.02	0	0	0	0	0	200,640
2.2	0.03	0	0	0	0	0	300,960
2.8	0.05	0	0	0	0	0	501,600
3.7	0.06	0	0	0	0	0	601,920
5.5	0.1	0	0	0	0	0	1,003,200
12.15	0.14	0	0	0	0	0	1,404,480

Comments
 Recurrence Intervals were taken from the View Annualized Results which was calculated based on the data inputs from the Historical Damages Before Mitigation section above. The remaining Impacts were assumed to be 5% of the length of the previous historical impacts, assuming 95% mitigation. The remaining Impact for the Recurrence Interval 1.2 years is shown as 0 because 5% of 0.04 is 0.002, and the software does not accept three decimal places.

Damages After Mitigation:

Annualized Damages After Mitigation

Other @ 40.9074200; -124.0634000

Annualized Recurrence Interval (years)	Damages and Losses (\$)	Annualized Damages and Losses (\$)
1.2	0	0
1.4	100,320	8,957
1.6	100,320	9,852
1.8	200,640	24,821
2.2	300,960	37,845
2.8	501,600	47,734
3.7	601,920	68,734
5.5	1,003,200	118,123
12.15	1,404,480	115,595

Benefits-Costs Summary

Other @ 40.9074200; -124.0634000

Total Standard Mitigation Benefits:		\$84,280,547
Total Social Benefits:		\$0
Total Mitigation Project Benefits:		\$84,280,547
Total Mitigation Project Cost:		\$2,081,612
Benefit Cost Ratio - Standard:		40.49
Benefit Cost Ratio - Standard + Social:		40.49