

Trail Project Management and Scheduling

Course Objectives

Good Project Scheduling Involves:

- Classifying and prioritizing trails
- Understanding why standards and specifications are required for trail work
- Develop the link between trail inventorying, assessing trails and completing trail work
- Quantifying trail maintenance and rehabilitation workload and cost
- Prioritizing and scheduling trail projects
- Developing tool, equipment and material inventories

Course Objectives

Good Project Scheduling Involves:

- Securing and developing labor sources
- Evaluating and monitoring trail systems

Trails traverse a wide variety of landforms and ecosystems



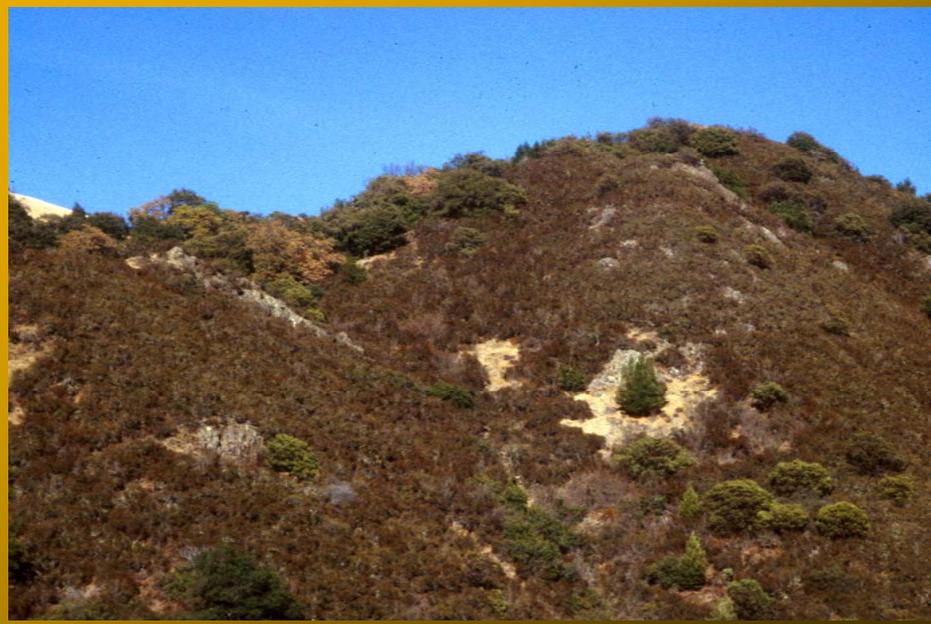
Hardwood Forests



Oak Grassland



Chaparral



Desert



Tropical



Alpine





Urban hikers



Backpackers



Equestrians



Mountain bikers



Winter Users



Multiuse



Off Highway Vehicles



Trail systems also include a variety of support facilities



How can we organize and manage such diverse and complex systems?



The organization of a trail system begins with classification of each trail

A trail matrix is used to evaluate each trail, identify its classification and establish its comparative rank or importance within the trail system

TRAIL NAME: _____			
TRAIL CLASSIFICATION MATRIX			
CRITERIA	Point Values	Rating	
1. Accessible	25		
2. Interpretive	15		
3. Within Visitor Use Facility	15		
4. Equestrian and Bike (Multi Use)	15		
5. Adjacent to Visitor Use Facility			
	0-1/4 mile	12	
	1/4 - 1 mile	8	
	1-2 mile	4	
	2 or more miles	0	
6. Connection of Visitor Use Facilities	5		
7. Parking Access	5		
8. Destination Oriented			
	0 - 1 mile	3	
	1 - 3 miles	2	
	3+ miles	1	
9. Connections with Other Agency Trail	+3 - +6		
10. Special Use or Routes	1		
11. Dead End Trail	0 or 3		
12. Loop or Connecting Trail	+1 - +3		
13. Fragile Environment			
	Protected by lessening use	-1 - -3	
	Protected by upgrading	+1 - +3	
14. Safety Factors			
a. Provide safe use by not providing improvements	-1 - -6		
b. Provide and maintain improvements	+0 - +5		
15. Staff Determined Use Patterns			
	Little or no use	1 - 3	
	Higher use	+1 - +3	
	TOTALS		
CLASSIFICATION: I			
I - 30			
II - 13 - 29			
III - 10 - 18			
IV - 0 - 9			

TRAIL NAME: _____		
TRAIL CLASSIFICATION MATRIX		
CRITERIA	Point Values	Rating
1. Accessible	25	
2. Interpretive	15	
3. Within Visitor Use Facility	15	
4. Equestrian and Bike (Multi Use)	15	
5. Adjacent to Visitor Use Facility		
0-1/4 mile	12	
1/4 - 1 mile	8	
1-2 miles	4	
2 or more miles	0	
6. Connection of Visitor Use Facilities	5	
7. Parking Access	5	
8. Destination Oriented		
0 - 1 mile	3	
1 -3 miles	2	
3 + miles	1	
9. Connection with Other Agency Trail	+3 - +5	
10. Special Use or Access	1	
11. Dead End Trail	0 or -3	
12. Loop or Connecting Trail	+1 - +3	
13. Fragile Environment		
Protected by lessening use	-1 - -3	
Protected by upgrading	+1 - +3	
14. Safety Factors		
a. Encourage less use by not Providing Improvements	-1 - -5	
b. Provide and maintain improvements	+0 - +5	
15. Staff Determined Use Patterns		
Little or no use	-1 - -3	
Higher use	+1 - +3	
	TOTALS	
I CLASSIFICATION: II I = 30+ II = 19 - 29 III = 10 - 18 IV = 0 - 9		

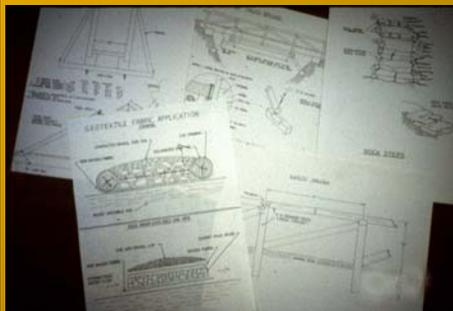
All work is based on design and construction standards developed for each trail class.



Specific design standards are also established for the various user groups



Once design and construction standards are understood the trail system can be inventoried and assessed using those standards



This can be accomplished by developing trail logs



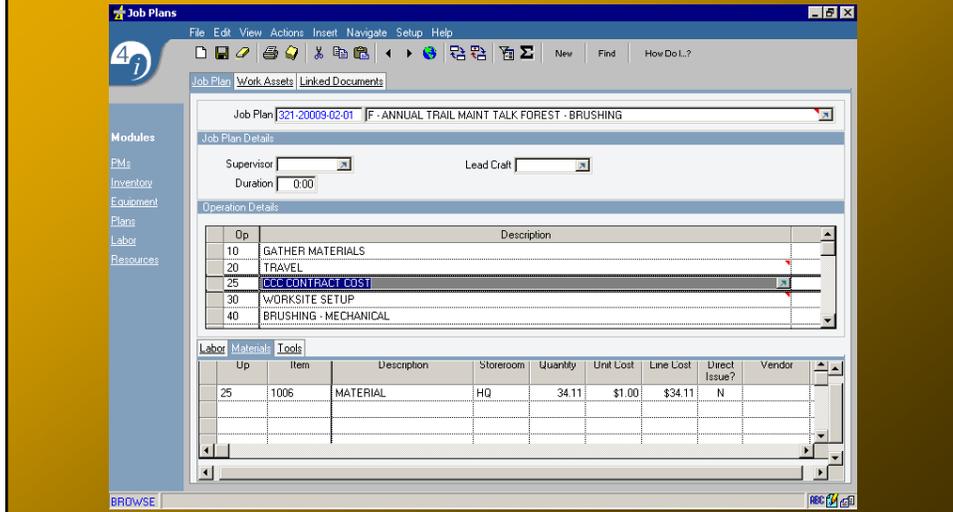
Trail logs identify and quantify all trail features as well as trail deficiencies and their corrective prescriptions



If digitally managed, the data collected from these inventories can be managed by hand or digitally to calculate trail maintenance workload & cost.

SCHEDULE FOR MAINTENANCE <input checked="" type="checkbox"/>		OR		HOUSEKEEPING <input type="checkbox"/>									
NAME OF FACILITY		FEET	MI	WIDTH	FACILITY NO.								
Overlook		363	0.1	3	123-F-2-03-1-002								
JOB DESCRIPTION	PERSON HOURS	YEARLY TOTAL		2 TO 5 YEAR CYCLE					PERSON SERVICE				
		PH	MATL	2 YR	3 YR	4 YR	5 YR	TOTAL SCHEDULED		PH	MATL	Class	HOURS
Safety Inspection 123-20001-01-01 5002	363	Feet Divided By 2 mile per Hour Hiking time or 10560 feet	0.03									PMS	0.03
Yearly Brushing 123-20009-02-01 5005	363	Feet Divided by 500 feet per person hour year cycle between brushing Hiking and Travel Time	0.73 0.09	Contract \$10.62				CCC	Contract	\$13.00	per hour		
Slough and Berm Maintenance 123-20009-03-01 5006	363	Feet Divided by 75 feet per person hour year cycle Hiking and Travel Time	0.97 0.12	Contract \$14.16				CCC	Contract	\$13.00	per hour	Planning and Supervision Hours	PMW II
Down Tree Removal 123-20009-04-01 5008	0	Number of Down Trees from trail log divided by trail Age Trail Age 0							CCC	Contract	\$13.00	per hour	Planning and Supervision Hours
Miscellaneous Logging Out and Brushing Supplies 123-20015-01-03 5020	\$1.58	Misc clearing and brushing supplies and equipment, 1 brush blade per mile plus saw, chain and fuel.		\$1.58									
Trail Reroute and Reconstruction 123-20015-01-03 5020	363	1% of trail tread on average 4 feet yearly divided by 7 feet per person hour equals hours annually Hiking and Travel Time	0.52 0.06	Contract \$7.58				CCC	Contract	\$13.00	per hour	Planning and Supervision Hours	PMW II
ANNUAL TOTAL MATERIAL COST ALL PAGES:				\$117.19	TOTAL PERSON HOURS ALL PAGES:					0.66			
TOTAL EQUIPMENT COSTS- FROM PAGE 4				\$0	SCHEDULE PREPARED BY: meb		DATE: 2/20/02						

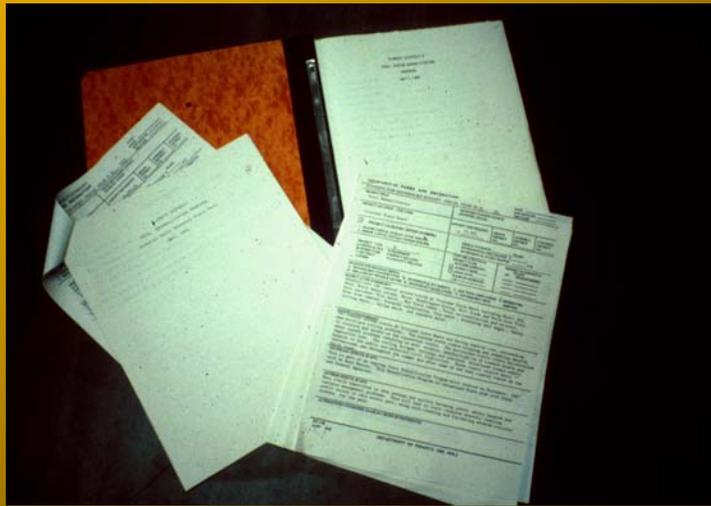
This data can be used in Maximo or other data base programs to justify annual trail maintenance budgets



These inventories can also be used to quantify trail rehabilitation cost

TRAIL: James Irvine						
CONSTRUCTION ACTIVITY	TOTALS	UNIT	PER UNIT COST		LABOR COST	MATERIAL COST
Helicopter Rental	0	hrs	@ \$0,000.00	-		\$0.00
Mule Packing Contract	0	day	@ \$125.00	-		\$0.00
Spike Camps						
If Spike Camp Put "1" in Box	1					
If No Spike Camp Put "2" in Box						
Spike Camp Move in Move-out Cost	2.00	ea	@ \$750.00	=		\$1,500.00
Spike Camp Overhead Costs	17.41	weeks	@ \$750.00	=		\$13,056.30
Cook Contract	4.35	month	@ \$4,800.00	-		\$20,890.08
Vehicle Cost (Crew Van/CCV)	4	month	@ \$600.00	-		\$2,611.26
Trail Crew Management Information					tax on materials	\$4,654.23
Crew Size (number of workers)	10					
Work Day Hours (8 or 10 hour days)	8					
Average Daily Hiking Time on Project					Hiking Time	
Display in increments of 15 minutes at .25 hours (ex .25, .50, .75, 1.00, 1.25, 1.50)	0.50				Total Labor	\$5,243.00
					Supervision Cost	\$89,131.00
					Tool & Equipment Replacement	\$13,369.65
						\$8,698.12
					Administrative Overhead Percentage	12%
						\$20,875.50
					TOTAL PROJECT COST	\$203,536.11

This data can be used to secure trail rehabilitation funds through capital outlay request and grant proposals



Trail deficiencies identified through inspections and staff input are then prioritized. Prioritizing trail projects should be an objective process.

ROADS, TRAILS AND RESOURCE MAINTENANCE SECTION
PROJECT REQUEST FORM

1. Unit _____ 2. Submitted By: _____ 3. Supervisor's Initials: _____ 4. Date: _____

5. Work Category: Roads Heavy Equipment Trails Resource Maintenance
 Other _____

6. Nature of Work: Health & Safety Resource Protection Preservation of Scenery
& Visitor Comfort New Improvement (Trailing) New for use
(Improvement): _____

7. Primary Project Supervisor, if other than R.T.R. _____

8. Project Description: _____

9. Equipment Requirements: _____

10. Fuel Requirements: _____

11. Material Requirements: _____

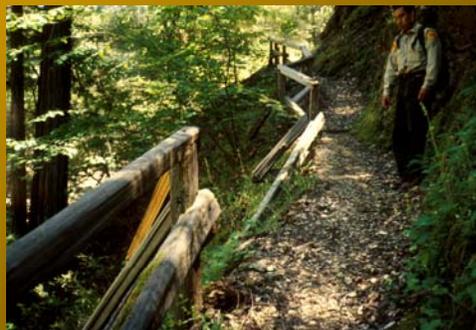
12. Crew Requirements: _____

13. Proposed Project Start Date: _____

14. Estimated Project Duration: _____



Health and safety



Resource Protection



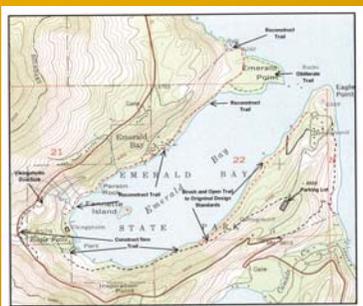
Preservation of investment



Visitor convenience



New trail development



For each of these categories points are assigned based on the severity of the problem.

Trail Project Selection Matrix								
Trail Project	Qualifying Deficiency (select all that apply and rank it on the severity scale shown)				New Trail Construction 1-3	Total Matrix Points	Trail Class	Trail Class Points
	Visitor Safety 1-10	Resource Protection 1-10	Preservation of Investment 1-7	Visitor Convenience 1-5				
West Ridge	5	6		4		15	3	19
Ten Tappo	8	10	2			20	3	18
Superintendent					2	2	2	22
South Fork	8	7				15	3	14
Rhododendron	5	6	3	2		16	3	18
Revelation			7			7	1	42
Ossagon	5	9				14	2	20
Little Creek		8		2		10	4	5
James Irvine	10	5	5			20	1	32
Foothill	10	6	4			20	2	25
Elk Prairie	8	7	5			20	1	38
Clintonia			6	2		8	3	15
Cathedral Trees			7	4		11	2	21
Brown Creek	2	6	2			10	2	23

Trail Project Selection Matrix (Sorted)								
Trail Project	Qualifying Deficiency (select all that apply and rank it on the severity scale shown)				New Trail Construction 1-3	Total Matrix Points	Trail Class	Trail Class Points
	Visitor Safety 1-10	Resource Protection 1-10	Preservation of Investment 1-7	Visitor Convenience 1-5				
Elk Prairie	8	7	5			20	1	38
James Irvine	10	5	5			20	1	32
Foothill	10	6	4			20	2	25
Ten Tappo	8	10	2			20	3	18
Rhododendron	5	6	3	2		16	3	18
West Ridge	5	6		4		15	3	19
South Fork	8	7				15	3	14
Ossagon	5	9				14	2	20
Cathedral Trees			7	4		11	2	21
Brown Creek	2	6	2			10	2	23
Little Creek		8		2		10	4	5
Clintonia			6	2		8	3	15
Revelation			7			7	1	42
Superintendent					2	2	2	22

Once the trail projects are prioritized they can be scheduled

NORTH COAST REDWOODS DISTRICT																			
ROADS TRAILS & RESOURCE MAINTENANCE SECTION																			
TRAIL PROJECTS SOUTH	1999/00	MONTH																	
		OCTOBER				NOVEMBER				DECEMBER				JANUARY					
PROJECT	LEADPERSON	1	8	17	22	29	5	12	19	26	3	10	17	24	31	7	14	21	28
REMOVE BAILEY BRIDGES	ALLSOP																		
REMOVE SEASONAL BRIDGES D. S.	ALLSOP																		
REMOVE SEASONAL BRIDGES P. S.	ALLSOP																		
CULVERT HEAD WALL INSTALLATION SQ. CRK. RD.	RIVAS																		
THORNTON ROAD REROUTE	KLEINSCHMIDT																		
AVENUE THE GIANTS TRAIL REHABILITATION	KLEINSCHMIDT																		
SOUTH PRAIRIE TRAIL REROUTE TOUCH - UP	KLEINSCHMIDT																		
INDIAN ORCHARD TRAIL REROUTE	KLEINSCHMIDT																		
MILL CREEK TRAIL REHABILITATION	LENNOX																		
INDIAN ORCHARD ROAD TO TRAIL CONVERSION	KLEINSCHMIDT																		
GIANT TREE BRIDGE	ALLSOP																		
BAXTER CAMP TRAIL REROUTE	MURRAY																		
BURLINGTON BRIDGE TRAIL REROUTE	MURRAY																		
BIG TREE TRAIL REHABILITATION	MURRAY																		
AVENUE THE GIANTS TRAIL REHABILITATION	MURRAY																		
INSTALL SEASONAL BRIDGES D. SECTOR	MURRAY																		
TRAIL BRUSHING D. SECTOR	MURRAY																		
AVENUE THE GIANTS TRAIL REHABILITATION	MURRAY																		
LOOKOUT TRAIL REROUTE	HALL																		
WOODLAND TRAIL BRIDGE REHAB.	HALL																		
BENBOW TRAIL REHABILITATION	HALL																		
MILL CREEK TRAIL REROUTE	HALL																		
TRAIL BRUSHING P. SECTOR	HALL																		
BAILEY BRIDGES INSTALLATION	ALLSOP																		
INSTALL SEASONAL BRIDGES P. SECTOR	ALLSOP																		
AVENUE THE GIANTS TRAIL REHABILITATION	HALL																		
RTR TRAIL CREW																			
HIGH ROCK CONSERVATION CAMP																			

The scheduling of trail projects must account for a number of variables

Visitor use patterns



Weather



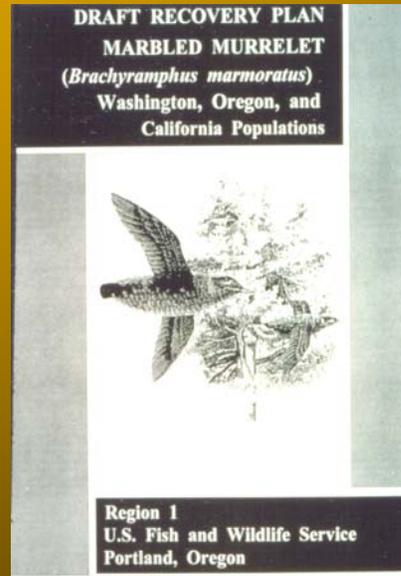
Soil moisture conditions



Project logistics and access



Rare and endangered species restrictions



Labor source availability



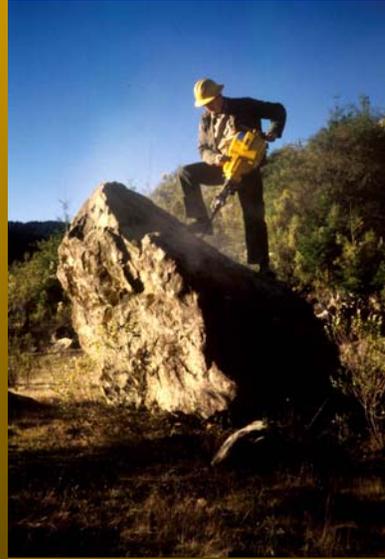
Matching project difficulty with the skill level of labor sources



Meeting crew development and training needs



Equipment and specialized tool support must also be scheduled



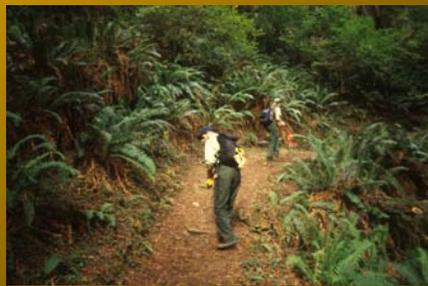
Materials and tools need to be secured in advance of the project start



Skilled and experience supervision is needed to provide project organization and efficiency, skill development and quality control



Completed trail projects are inspected and inventoried



Revise trail logs and maintenance budget information

SCHEDULE FOR MAINTENANCE <input checked="" type="checkbox"/>		OR		HOUSEKEEPING <input type="checkbox"/>									
NAME OF FACILITY		FEET	MI	WIDTH	FACILITY NO.								
Overlook		363	0.1	3	123-F-2-03-1-002								
JOB DESCRIPTION	DAILY TO ANNUAL CYCLE		YEARLY TOTAL		2 TO 5 YEAR CYCLE					PERSONAL SERVICE			
	PERSON HOURS	PH	MATL	2	3	4	5	NEXT 3 F.Y.	TOTAL	PH	MATL	Class	PERSON HOURS
DAILY TO ANNUAL	PH	MATL	YR	YR	YR	YR	SCHEDULED	PH	MATL				
Safety Inspection 123-20001-01-01 5002	363	Feet Divided By 2 mile per hour Hiking time or 10560 feet	0.03									PMS	0.03
Yearly Brushing 123-20009-02-01 5005	1	Feet Divided by 500 feet per person hour year cycle between brushing Hiking and Travel Time	0.73	Contract \$10.62				CCC Contract \$13.00 per hour					
			0.09					Planning and Supervision Hours				PMW II	0.12
Slough and Berm Maintenance 123-20009-03-01 5006	363	Feet Divided by 75 feet per person hour year cycle Hiking and Travel Time	0.97	Contract \$14.16				CCC Contract \$13.00 per hour					
	5		0.12					Planning and Supervision Hours				PMW II	0.16
Down Tree Removal 123-20009-04-01 5008	0	Number of Down Trees from trail log divided by trail Age Yearly Average of Down Trees times average of 1 hour per tree Hiking and Travel Time	0.00	Contract \$0.00				CCC Contract \$13.00 per hour					
	20		0.00					Planning and Supervision Hours				PMW II	0.00
Miscellaneous Logging Out and Brushing Supplies 123-20015-01-03 5020	\$1.58	Misc clearing and brushing supplies and equipment. 1 brush blade per mile plus saw chain and fuel.		\$1.58									
	363	1% of trail tread on average											
Trail Reroute and Reconstruction 123-20015-01-03 5020	4	feet yearly divided by 7 feet per person hour equals hours annually Hiking and Travel Time	0.52	Contract \$7.58				CCC Contract \$13.00 per hour					
			0.06					Planning and Supervision Hours				PMW II	0.09
ANNUAL TOTAL MATERIAL COST ALL PAGES:				\$117.19	TOTAL PERSON HOURS ALL PAGES								0.66
TOTAL EQUIPMENT COSTS- FROM PAGE 4				\$0	SCHEDULE PREPARED BY: meb								DATE: 2/20/02

Establish monitoring sites to evaluate project effectiveness



Evaluating projects is a key component of adaptive management and developing best management practices



The trail management and scheduling process requires :

- Classifying and prioritizing trails
- Developing trail standards
- Inventorying and assessing trails
- Quantifying trail maintenance and rehabilitation cost
- Prioritizing and scheduling trail projects
- Securing labor sources, materials and tools
- Providing supervision, training and quality control

The trail management and scheduling process requires :

- Performing post project inspections and inventories
- Monitoring and evaluating completed projects
- Continually adapting and improving trail maintenance and construction practices

Trail Description:

This is the Big Rock Trail, a two mile section of the interconnecting trails and fire roads. The Big Rock Trail traverses north on Big Rock Ridge. This trail is designated as multi-use for pedestrians, mountain bikes and equestrians. It goes through open grasslands and oak parkland vegetation types as it ascends the south facing side of Big Rock Ridge. This trail section connects with Big rock fire road with a beautiful view of the coastal hills and the San Francisco Bay Area. The trail travels through private property and is on an easement. Previous archeological surveys have not identified any significant cultural resources. The trail is located on safe topography. The use on this trail is high, mainly evening and recreational hikers getting out for exercise. Besides a parking lot, there are no facilities in proximity of this trail section. It does not connect any user facilities.

Trail Matrix Classification Exercise

