

Mountain Bicycle Trail Design Parameters / Trail Difficulty Ratings

Mountain Bicycle Trails are managed to conform to Difficulty Ratings rather than Trail Classes because Difficulty Ratings from Easy to Most Difficult are found across a range of Mountain Bicycle Trail Classes.

The following matrix describes levels of trail technical difficulty as they apply to Mountain Bicycle Trails, starting with Easy and moving up to Expert Unlimited. These are applied to any trail in the Mountain Bicycle Trail Class Matrix. Included are general and detailed descriptions of trails, Native Trail Features (NTFs) which are native earth, log and rock formed trail features, Technical Trail Features (TTFs) which are generally fastened wooden construction and include use of non-native materials and metal fasteners. This Matrix quantifies the technical trail difficulty for Mountain Bicycles.

Design Parameters are technical guidelines for the survey, design, construction, maintenance, and assessment of National Forest System trails based on their Designed Use and Trail Difficulty Rating and consistent with their management intent.

Designed Use Trail Difficulty Rating Mountain Bicycle		(Easy) Green Circle	(More Difficult) Blue square	(Most difficult) Black Diamond	(Expert Unlimited) Double Black Diamond *1
General Description	Most Likely Mountain Bicycle Trail Class	*Associated with any Mountain Bicycle Trail Class	*Associated with any Mountain Bicycle Trail Class	*Associated with Mountain Bicycle Trail Classes 1 - 4	*Associated with Mountain Bicycle Trail Classes 3 and 4
	Rider Skill Level	*Minimum rider skill required.	*Intermediate rider skills required.	* Advanced rider skills required.	* Exceptional rider skill & balance essential.
	Trail Experience	*Gentle climbs and easily avoidable obstacles such as rocks, roots and potholes.	*Challenging riding with moderate slopes and or obstacles, possibly on a narrow trail with mixed traction.	*May include a mixture of steep climbs & descents, loose trail surfaces, numerous difficult obstacles to avoid or jump over, drop-offs and sharp corners. Some sections may be easier to walk.	*Exceeding Most Difficult
	Constructed Feature Placement	*NTF/TTF shall be alternate to the main tread except Technical Trail Designation *No NTF/TTF on Classic Trail Designation (see *2)	*NTF/TTF shall be alternate to the main tread except Technical Trail Designation *No NTF/TTF on Classic Trail Designation (see *2)	*NTF/TTF shall be alternate to the main tread except Technical Trail Designation *No NTF/TTF on Classic Trail Designation (see *2)	*NTF/TTF can be used in the main tread *No NTF/TTF on Classic Trail Designation (see *2)

Designed Use Trail Difficulty Rating Mountain Bicycle		(Easy) Green Circle	(More Difficult) Blue square	(Most difficult) Black Diamond	(Expert Unlimited) Double Black Diamond *1
Detailed Trail Design Specification	Protrusions (may be rideable)	*Max. of 4" vertical *Not continuous *Logs & roots perpendicular to direction of travel (±20°)	*Maximum of 6" vertical *May be continuous	*Maximum of 12" vertical *May be continuous	*Exceeding Most Difficult
	Obstructions (may be avoidable)	*Maximum of 8" vertical	*Maximum of 12" vertical	*Maximum of 24" vertical	*Exceeding Most Difficult
	Target Grade	*Maximum sustained grade: 10%	*Maximum sustained grade: 15%	*Maximum sustained grade: 20%	*Exceeding Most Difficult
	Short Pitch Maximum Grade	*Maximum climbing grade: 15% not to exceed 200' *Maximum descending grade: 35% not to exceed 100'	*Maximum climbing grade 20% not to exceed 200' *Maximum descending grade: 70% not to exceed 100'	*Maximum climbing grade: 30% not to exceed 100' *Maximum descending grade: 100% not to exceed 100'	*Exceeding Most Difficult
	Maximum Pitch Density	*5%-20% of trail	*10%-30% of trail	*20%-40% of trail	*Exceeding Most Difficult
	Design Turn Radius	*6' minimum	*4' minimum	*2' minimum	*No minimum
Trail Features General	Width to Height ratio	*NTF/TTF minimum width to height ratio of 1:1.33	*NTF/TTF minimum width to height ratio of 1:2	* NTF/TTF minimum width to height ratio of 1:4	* NTF/TTF minimum ratio 1:4 for structures over 6'
	Feature Experience	*Wide, flat, low, rollable features	*Small features wide and rollable	*Elevated features *Connected features may require wheel lifting techniques *Steep descents with sharp transitions	*Elevated features *Connected features *Steep descents with sharp transitions
	Jumps and Drops	*No drops or jumps	*Small jumps *Small rollable drops	*Large double jumps *Drop offs not to exceed 5' vertical	*Mandatory air - gap jumps

Designed Use Trail Difficulty Rating Mountain Bicycle		(Easy) Green Circle	(More Difficult) Blue square	(Most difficult) Black Diamond	(Expert Unlimited) Double Black Diamond *1
Detailed NTF (Native Trail Feature)	Basic Description	*Log features less than 2' high. Minimum width of flat tread is three-quarters the height. For connected sections, the bisecting angle between each connected section must be large enough to allow the bicycle to complete the turn without requiring any wheel lifting techniques.	*Log feature less than 4' high. Minimum width of flat tread is one-half the height. For connected sections, no wheel lifting techniques required.	*Log features less than 6' high. Minimum width of flat tread is one-quarter the height.	* Log features less than 10' high. Minimum width of flat tread is one-quarter the height.
	Drops, Jumps and Ramps	None	*Drop-offs not exceeding 16" high *Rock or dirt ramps not to exceed 100% and less than 50' *Jumps: table top jumps maximum height 3', no double jumps *No jumps with consequences for lack of speed	*Drop-offs not exceeding 5' vertical (similar to Tahoe Basin spec.) *Steep Rock or dirt ramps, no grade limit, less than 50' *Jumps: Table tops, no maximum height. Double jumps no maximum height. Jumps must be rollable	*Drop-offs not exceeding 8' vertical *Steep Rock or dirt ramps, no grade limit *Exceeding Most Difficult
	Fall Zone	3' from center line on all sides	4' from center line on all sides	5' from center line on all sides	5' from center line on all sides

Designed Use Trail Difficulty Rating Mountain Bicycle		(Easy) Green Circle	(More Difficult) Blue square	(Most difficult) Black Diamond	(Expert Unlimited) Double Black Diamond *1
Detailed TTF (Technical Trail Feature)	Basic Description	*Features less than 2' high. Minimum width of flat decking is three-quarters the height. For connected sections, the bisecting angle between each connected section must be large enough to allow the bicycle to complete the turn without requiring any wheel lifting techniques.	* Features less than 4' high. Minimum width of flat decking is one-half the height. For connected sections, no wheel lifting techniques required.	*Feature less than 6' high. Minimum width of flat decking is one-quarter the height.	* Features less than 10' high. Minimum width of flat tread is one-fifth the height for structures.
	Drops, Jumps and Ramps	None	*Drop-offs not exceeding 16" high *Ramps not to exceed 100% and less than 50' *Jumps: Table Top like jumps maximum height 3', no double jumps *No jumps with consequences for lack of speed	*Drop-offs not exceeding 5' vertical *Steep Ramps, no grade limit, less than 50' *Jumps: Table Top like, no maximum height. Double jumps no maximum height. Jumps must be rollable	*Gap Jumps and rhythm sections *Drop-offs not exceeding 8' vertical *Exceeding Most Difficult
	Fall Zone	3' from center line on all sides	4' from center line on all sides	5' from center line on all sides	5' from center line on all sides

***1. Expert Unlimited:**

This Difficulty Rating will not be found on USFS trails except special use permitted areas or events.

***2. CLASSIC TRAIL DESIGNATION:**

Other than the below limitations Classic Trails are categorized by the same difficulty ratings as all other trails.

*Classic trails are generally all natural terrain and conform to Class 1 or 2.

*There may be some grandfathered NTFs.

*No further proliferation of NTFs or TTFs will take place on these trails.

*No use of dirt working machines for routine maintenance. A new trail or section built by machine can there after be maintained as "classic".

Machines may be used for creating drainage where handwork is not effective.

*No constructed structures except bridges crossing water bodies or as needed for proper drainage or soil erosion mitigation. Natural deadfall may be incorporated into the trail as an NTF if it is not moved from where it fell naturally. Other than bridges, drainage and signs, there will be no use of fasteners.

*All dirt work will be minimal and be primarily for drainage, keeping the tread narrow or other wise keeping users on the trail. No obvious jumps or berms will be constructed however enhancements that are consistent with the natural terrain or historic trail building techniques are acceptable.

***3. OPEN TRAIL DESIGNATION:**

NTFs and TTFs shall be alternate to the main tread.

***4. TECHNICAL TRAIL DESIGNATION:**

Technical Trails are categorized by the same difficulty ratings as all other trails except that NTFs and TTFs are allowed in the main tread of the trail and are not restricted to being an alternate line. I.E., Lair, Slalom play loop, Whoops etc.