



Guidelines for a Quality Trail Experience

Experience Driven Trail Guidelines

Laurel Harkness, IMBA California-Hawaii Region Director



Supported by funding from:

SHIMANO

In partnership with the BLM



Why Trails?

- Landscapes
 - Access
 - Interpret
 - Minimize Impacts
- *Experiences!*
 - Setting
 - Trail itself?



Sustainable Trails



- BMPs for trail design and construction



You don't want your trails to end up like these

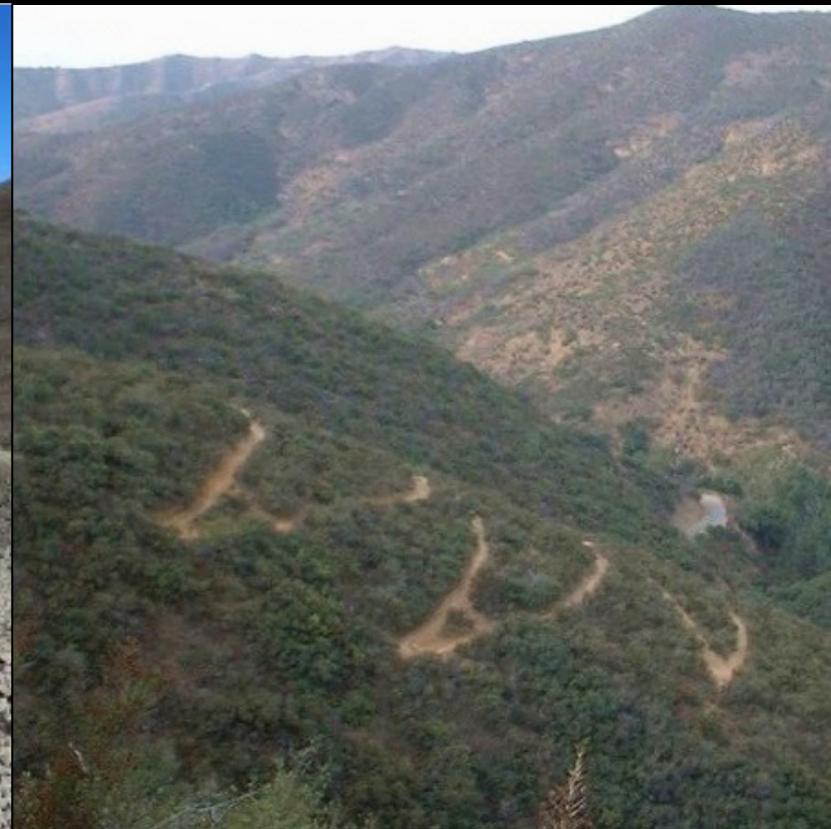


Sustainable Trails

- ✓ Contour alignment
- ✓ Half-rule

- ✓ Outslope

Problems?



Trail Standards ≠ Experiences

“What we have here is a failure to communicate...”



Know Your Trail Users



Trail Runners



Equestrians



Hikers



Mountain Bikers

Hikers



New River Gorge, WV



Grand Canyon, AZ



Trail Runners





Equestrians



Motorized Users



Mountain Bikers



Desired Experiences?

- Connection to nature and escape
- Connections, loops, and variety
- Challenge and skills progression
- Exercise
- Exposure?
- Flow?
- Play?

Sun Valley, ID



GQTE

- Trail planning, design, construction, maintenance, and management guidelines
- Within Social, Environmental, and Regulatory Constraints
- Experience-based

GQTE

Outline

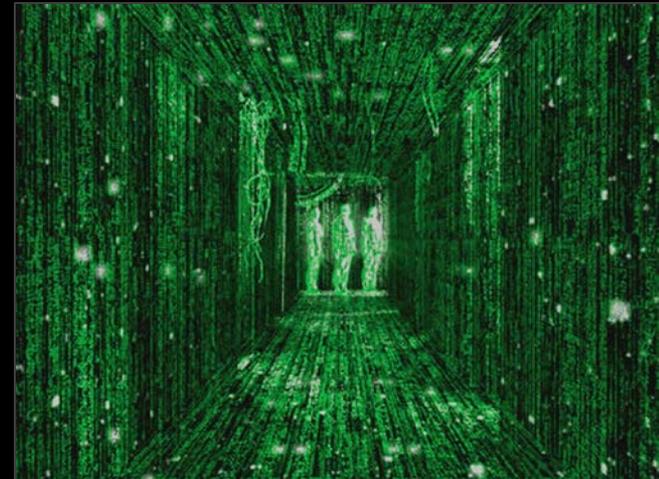
- Background and Vision
- Environmental & Social Factors
- Planning & Design

Based upon GQBE



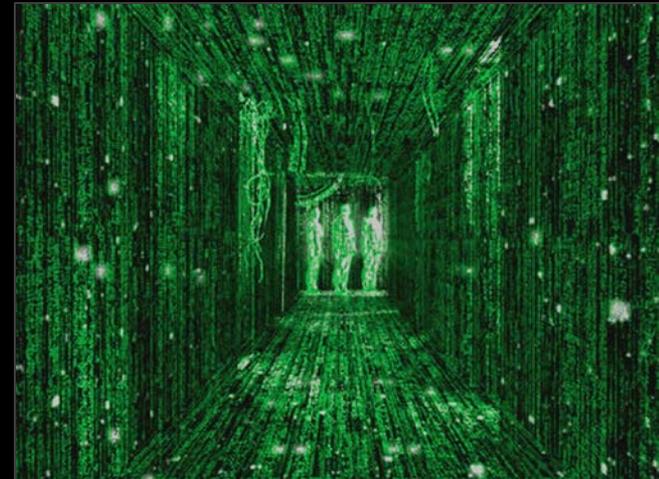
GQTE: The Matrix

- Interactive Tool
- Identify and prioritize trail experiences
- Supported with GIS



GQTE: The Matrix

- Environmental Factors
- Trail Characteristics
- Experience Characteristics
- Spectrum for each factor



GQTE: The Matrix

Environmental Factors

- Physiographic regions
- Specific characteristics within each planning area:
 - Topography
 - Soils
 - Rock type
 - Dominant vegetation
 - Hydrology
 - Climate





GQTE: The Matrix

Social & Regulatory Context

- Recreation Management Plans (RMP)
- Recreation Setting Characteristics (RSC)
- Regulatory framework
 - Land Designations
 - NEPA / CEQA
 - Risk Management



GQTE: The Matrix

Social & Regulatory Context

- Social and Cultural Factors
 - Riding styles differ
 - Trail culture – shared use
 - Historic and cultural context – sense of place, interpret & protect
 - NICA – middle school, high school teams

Recreation Setting Characteristic

Urban



Large areas (generally >5000 acres), at least 3 miles from the nearest motor vehicle access. Unmodified natural landscape with little evidence of human modification. Experience goals: solitude and isolation from human civilization, close to nature, greater degree of personal risk and

GQTE: Experience Characteristics

RECREATION SETTING CHARACTERISTICS MATRIX

PHYSICAL COMPONENT – Qualities of the Landscape

| | <i>Primitive Classification</i> | <i>Back Country Classification</i> | <i>Middle Country Classification</i> | <i>Front Country Classification</i> | <i>Rural Classification</i> | <i>Urban Classification</i> |
|---|---|---|---|--|---|--|
| Remoteness (approx. distance from routes) | More than ½ mile from either mechanized or motorized routes | Within ½ mile of mechanized routes. | Within ½ mile of four-wheel drive vehicle, ATV and motorcycles routes | Within ¼ mile of low clearance or passenger vehicle routes (includes unpaved County roads and private land routes) | Within ½ mile of paved/primary roads and highways | Within ½ mile of streets and roads within municipalities and along highways |
| Naturalness (landscape texture form, line, color) | Undisturbed natural landscape. | Natural landscape with any modifications in harmony with surroundings and not visually obvious or evident (e.g. stock ponds, trails). | Character of the natural landscape retained. A few modifications contrast with character of the landscape (e.g. fences, primitive roads). | Character of the natural landscape partially modified but none overpower natural landscape (e.g. roads, structures, utilities) | Character of the natural landscape considerably modified (agriculture, residential or industrial) | Urbanized developments dominate landscape. |
| Facilities | No structures. Footpaths and water trails only | Developed trails made mostly of native materials such as log bridges. Structures are rare and isolated. | Maintained and marked trails, simple trailhead developments and basic toilets | Rustic facilities such as campsites, restrooms, trailheads, and interpretive displays | Modern facilities such as campgrounds, group shelters, boat launches, and occasional exhibits. | Elaborate full-service facilities such as laundries, restaurants, and groceries. |

SOCIAL COMPONENT – Qualities Associated with Use

| | <i>Primitive Classification</i> | <i>Back Country Classification</i> | <i>Middle Country Classification</i> | <i>Front Country Classification</i> | <i>Rural Classification</i> | <i>Urban Classification</i> |
|---|---|---|---|---|--|--|
| Contacts (avg. with any other group) | Fewer than 3 encounters/day at camp sites and fewer than 6 encounters/day on travel routes. | 3-6 encounters/day off travel routes (e.g., campsites) and 7-15 encounters/day on travel routes. | 7-14 encounters/day off travel routes (e.g., staging areas) and 15-29 encounters/day on travel routes. | 15-29 encounters/day off travel routes (e.g., campgrounds) and 30 or more encounters/day on travel routes. | People seem to be generally everywhere. | Busy place with other people constantly in view. |
| Group Size (average - other than you own) | Fewer than or equal to 3 people per group. | 4-6 people per group. | 7-12 people per group. | 13-25 people per group. | 26-50 people per group. | Greater than 50 people per group. |
| Evidence of Use | No alteration of the natural terrain. Footprints only observed. Sounds of people rare. | Areas of alteration uncommon. Little surface vegetation wear observed. Sounds of people infrequent. | Small areas of alteration. Surface vegetation showing wear with some bare soils. Sounds of people occasionally heard. | Small areas of alteration prevalent. Surface vegetation gone with compacted soils observed. Sounds of people regularly heard. | A few large areas of alteration. Surface vegetation absent with hardened soils. Sounds of people frequently heard. | Large areas of alteration prevalent. Some erosion. Constantly hear people. |

OPERATIONAL COMPONENT – Conditions Created by Management and Controls over Recreation Use

| | <i>Primitive Classification</i> | <i>Back Country Classification</i> | <i>Middle Country Classification</i> | <i>Front Country Classification</i> | <i>Rural Classification</i> | <i>Urban Classification</i> |
|------------------------------------|---|---|---|---|---|---|
| Access (types of travel allowed) | Foot, horse, and non-motorized float boat travel | Mountain bikes and perhaps other mechanized use, but all is non-motorized. | Four-wheel drives, all terrain vehicles, dirt bikes, or snowmobiles in addition to non-motorized, mechanized use. | Two-wheel drive vehicles predominant, but also four-wheel drives and non-motorized, mechanized use. | Ordinary highway auto and truck traffic is characteristic. | Wide variety of street vehicles and highway traffic is ever-present. |
| Visitor Services (and information) | No maps or brochures available on-site. Staff rarely present to provide on-site assistance. | Basic maps, staff infrequently present (e.g. seasonally, high use periods) to provide on-site assistance. | Area brochures and maps, staff occasionally (e.g. most weekends) present to provide on-site assistance. | Information materials describe recreation areas & activities, staff periodically present (e.g. weekdays & weekends) | Information described to the left, plus experience and benefit descriptions, staff regularly present (e.g. almost daily). | Information described to the left, plus regularly scheduled on-site outdoor demonstrations and clinics. |
| Management Controls | No on-site postings/signing of visitor regulations, interpretive information or ethics. Few use restrictions. | Basic user regulations at key access points. Minimum use restrictions. | Some regulatory and ethics signing. Moderate use restrictions. (e.g. camping, human waste) | Rules, regulations and ethics clearly posted. Use restrictions, limitations and/or closures. | Regulations strict and ethics prominent. Use may be limited by permit, reservation, etc. | Enforcement in addition to rules to reduce conflicts, hazards, and resource damage. |

NOTE: This matrix can be customized to meet particular planning needs: 1) classes can be added, split, or merged; 2) characteristics can be added or deleted; 3) class names can be changed; and 4) the text can be modified. However, the concept of a spectrum must remain intact.



Setting vs Experience



Urban

Solitude?

Play?

Escape?

Challenge?



GQTE: Experience Characteristics

Primitive

Play



Urban

Low Play

High Play



GQTE: Experience Characteristics

Exposure



GQTE: Trail Characteristics

- Translating experiences into trail characteristics
- Assessing how trail characteristics affect experiences

GQTE: Trail Characteristics

Berms



GQTE: Trail Characteristics

Texture



GQTE: Trail Characteristics

Interactive Effects

Trail and Experience
Characteristics:

- Texture x Exposure



- Experiences define trail characteristics
- Constrained by environmental and regulatory factors



Targeted experiences...

Different physiographic regions

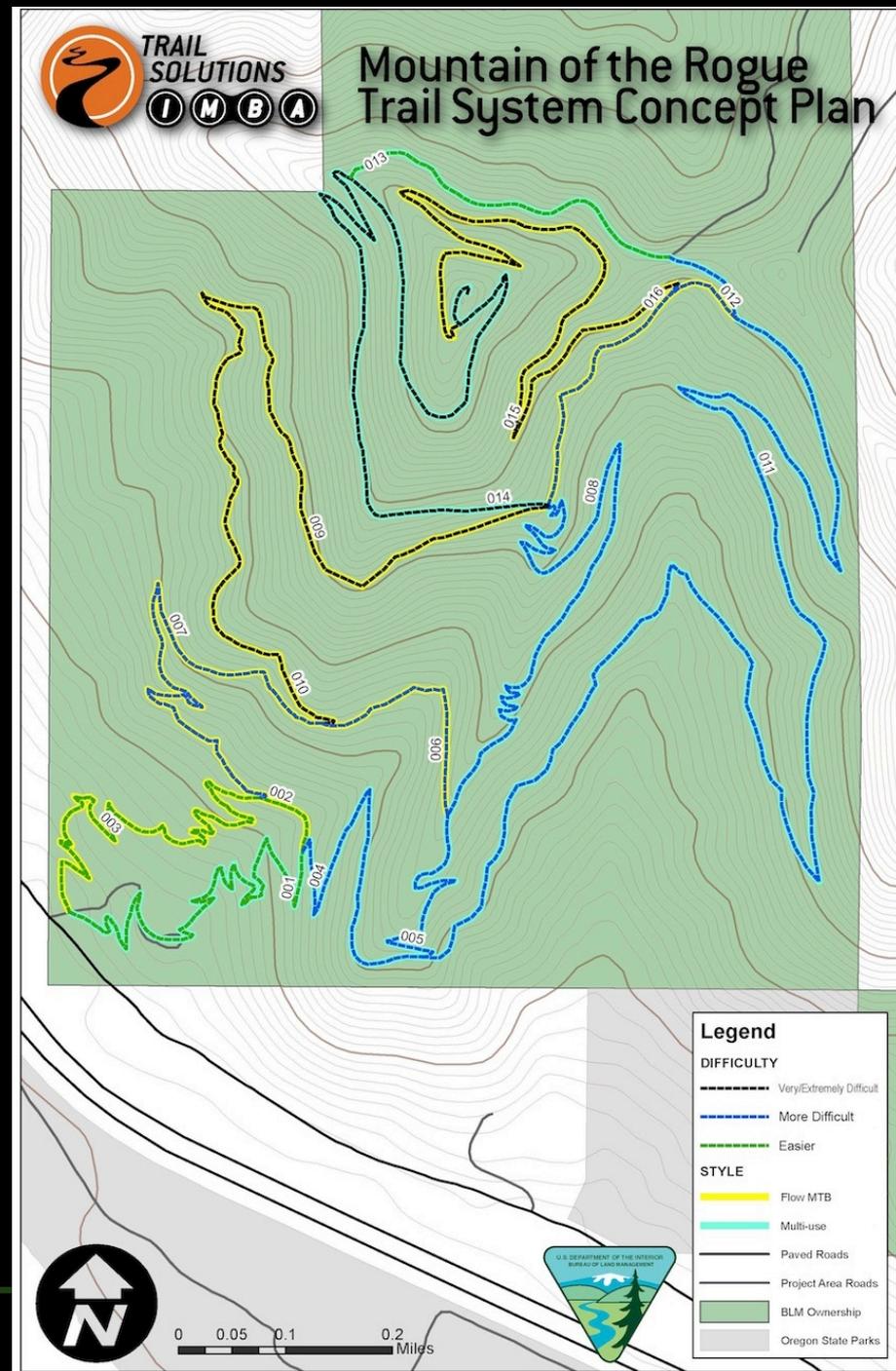
- Can different landscapes provide similar experiences for users?
- What makes them work?



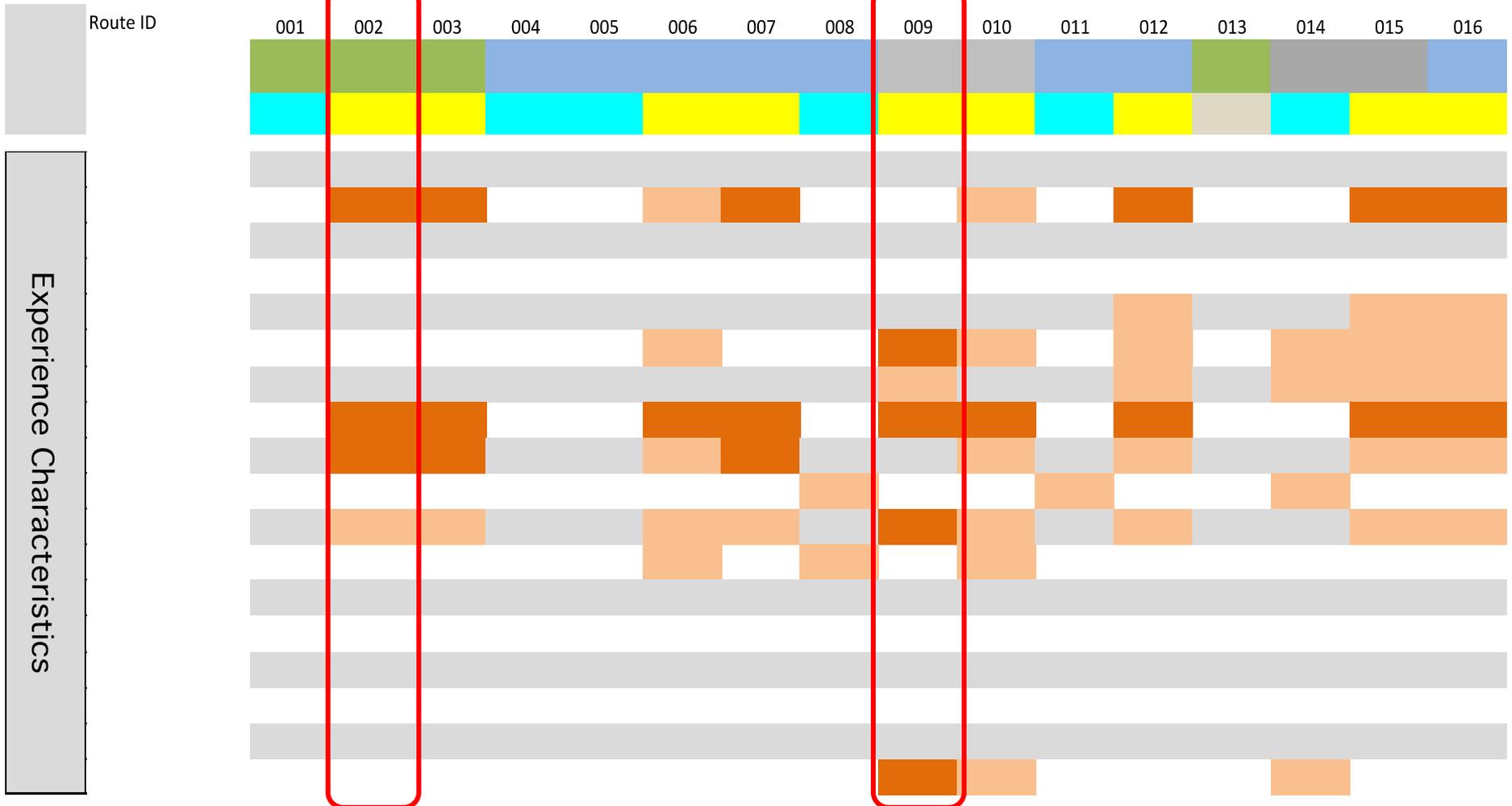
Tools Testing: Construction Specs

Mountain of the Rogue

- Experience driven
- Primary experience factors
- Defined trailbuilding specs
- 7 miles constructed, more planned



rail Experience Recommendations: Experience Characteristics



Mountain of the Rogue



Construction Specifications

Alsea Falls – Whistlepunk Trail

| Experience Characteristic | Desired Characteristic |
|----------------------------|--------------------------------------|
| Setting | Relatively primitive |
| Technical Challenge | High intermediate |
| Trail Flow | Bike optimized, but less predictable |
| Nature | Immersed in nature |
| Playfulness | Moderate |
| Exposure | Relatively low exposure |

Details:

- 3% to 6% average trail grade (400' elevation loss), 15% maximum for short sections (<50ft)
- Downhill directional
- Difficulty rating: Intermediate to Advanced-Intermediate (see table for trail characteristics)
- Bike-optimized, but not a “flow trail”
- Moderate to high surface roughness
- Tread shaping should blend with environment
- Portions of route will have a marbled murrelet construction restriction*

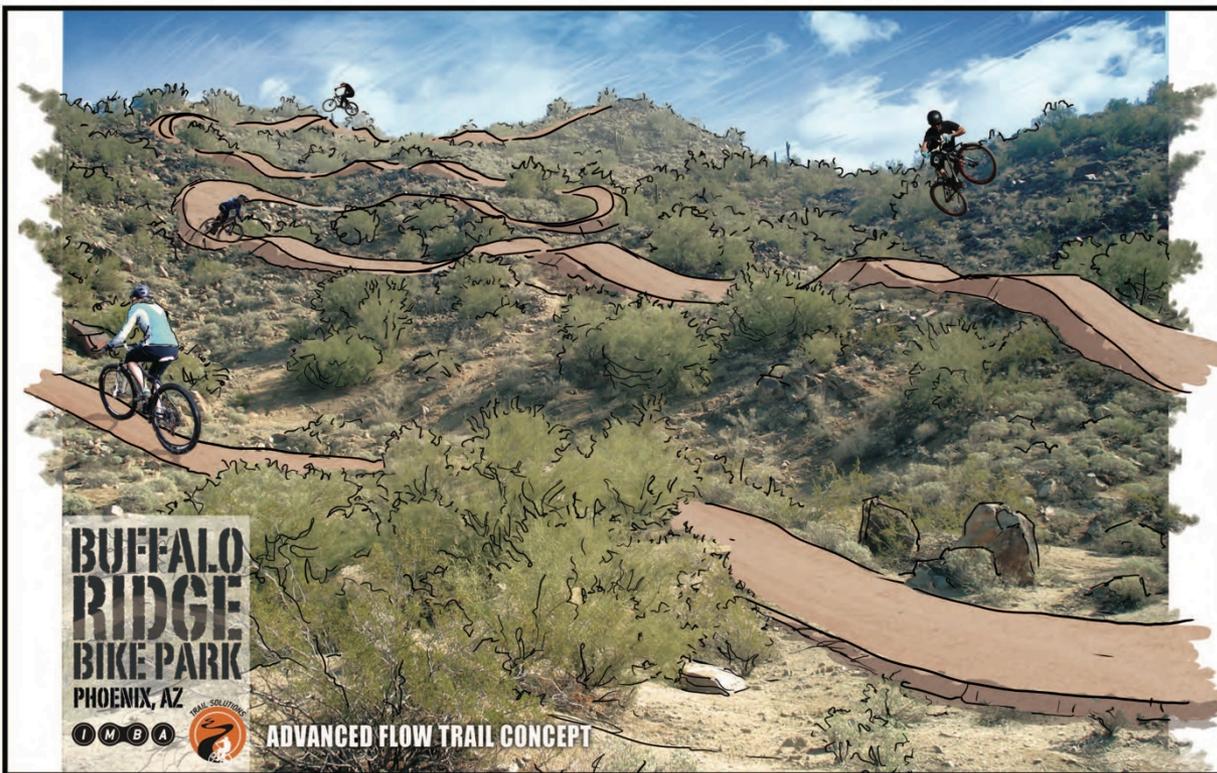
Construction Specifications

Alsea Falls – Whistlepunk Trail



Trail Specifications

Play + Flow → Berms & Jumps → Specs



1. Beginner tabletops. Flat spaces between jumps to give beginners room for error.

Height: 24 inches or less

Takeoff/landing: <30 degrees

Distance: <4 feet



2. Intermediate tabletops.

Spaced with constant transitions, to let riders pump through the set.



Height: 2.5-3 feet

Takeoff/landing: <30 degrees

Distance: 5-6 feet

2A. Intermediate step-ups.

Takeoff height/angle: 3'/45°

Landing height/angle: 4.5'/30°



2B. Intermediate tabletops.

Same as A. Distances not to exceed 8 feet.

3. Advanced-intermediate jumps. Constant transitions. Table-doubles with blunt landings.

Height: 54 inches or less

Takeoff/landing: <45 degrees degrees

Distance: 6-12 feet



USER MANAGEMENT FEATURE: CHOKE

Narrowing of trail with rocks, logs or vegetation to add challenge or control speed.



Primary Experience
Characteristics

Challenge
Exposure



Design Elements



Trail Specifications



Trail Specifications

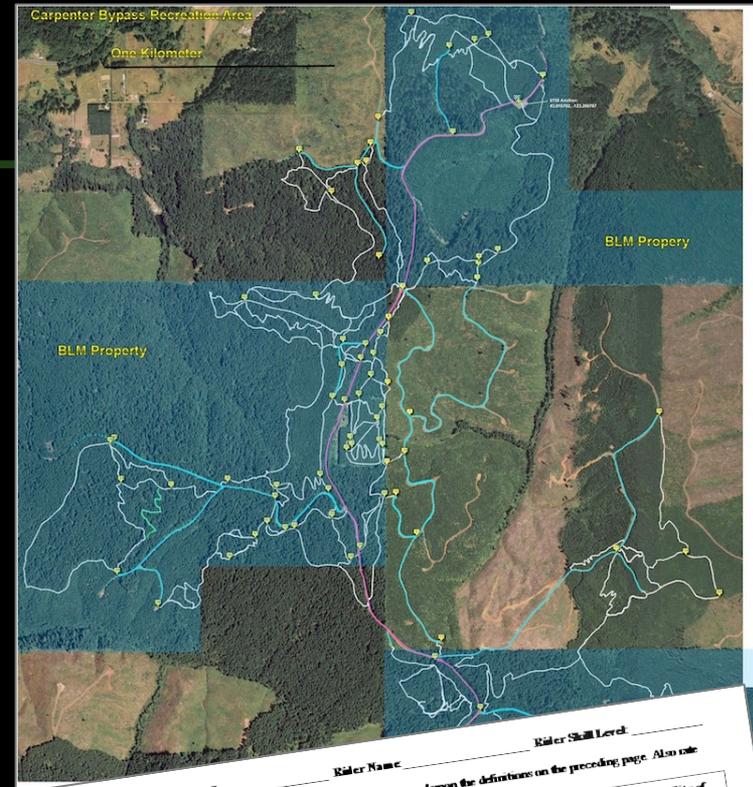
USER MANAGEMENT FEATURE: OPTIONAL LINES

SUBTITLE FOR OPTIONAL LINES



Process

- Gap Analysis –
 - Data Collection
 - Identify Resources
 - Develop Strategy
- Assess Existing System
 - Experience Evaluations
- Outreach
 - Desired experiences
- Can fit within constraints?
- Design for experiences



Rider Name: _____ Rider Skill Level: _____

GQIE Trail Experience Evaluation Trail _____

Please rate your experience for each characteristic along a spectrum from 1 to 5, based upon the definitions on the preceding page. Also rate how desirable each characteristic is for your experience, from 1 (undesirable) to 5 (highly desirable).

| Characteristic | 1 | 2 | 3 | 4 | 5 |
|--|---|---|---|---|---|
| 1. Setting – How would you describe the setting of the trail system? Urban _____ Positive _____ | | | | | |
| 2. Technical Challenge – Based upon challenge and skill (not exertion), how difficult did you find the trail? Easy _____ Very Challenging _____ | | | | | |
| 3. Trail Flow – How would you rate the trail flow? Poor _____ Excellent _____ | | | | | |
| 4. Nature – How would you rate your experience of nature? No Connection _____ Immersed _____ | | | | | |
| 5. Playfulness – How would you rate the playfulness of the trail? Low _____ High _____ | | | | | |
| 6. Exposure/Risk – Did anything on the trail make you apprehensive or anxious, even for a moment? Low _____ High _____ | | | | | |
| 7. How would you rate your overall trail experience? Poor _____ Exceptional _____ | | | | | |

Desirability of Characteristic:

Setting _____

Challenge _____

Flow _____

Nature _____

Play _____

Exposure _____



USFS Trail Guidelines and Planning

FS Trail Guidelines

- Bicycle Trail Design Parameters

Bike-Optimized Experiences

- Jakes Rocks Epic Mountain Bike Trail EA



Design Parameters (FSH 2309.18, Section 23.13, Exhibit 01)

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 Class and consistent with their management intent¹. Local deviations from any Design Parameter may be established based on trail-specific conditions, topography, or other factors, provided that the deviations are consistent with the general intent of the applicable Trail Class.

| Designed Use BICYCLE | | Trail Class 1 | Trail Class 2 | Trail Class 3 | Trail Class 4 | Trail Class 5 |
|--------------------------------|-------------------------------|---|--|---|--|---|
| Design Tread Width | Single Lane | 6" – 12" | 12" – 24" | 18" – 36" | 24" – 48" | 36" – 60" |
| | Double Lane | 36" – 48" | 36" – 48" | 36" – 48" | 48" – 84" | 72" – 120" |
| | Structures (Minimum Width) | 18" | 18" | 36" | 48" | 60" |
| Design Surface ² | Type | Native, ungraded May be continuously rough Sections of soft or unstable tread on grades < 5% may be common and continuous | Native, with limited grading May be continuously rough Sections of soft or unstable tread on grades < 5% may be common | Native, with some on-site borrow or imported material where needed for stabilization and occasional grading Intermittently rough Sections of soft or unstable tread on grades < 5% may be present, but not common | Native, with improved sections of borrow or imported materials and routine grading Stable, with minor roughness | Likely imported material and routine grading Uniform, firm, and stable |
| | Protrusions | ≤ 24" Likely common and continuous | ≤ 6" May be common and continuous | ≤ 3" May be common, but not continuous | ≤ 3" Uncommon and not continuous | No protrusions |
| | Obstacles (Maximum Height) | 24" | 12" | 10" | 8" | No obstacles |
| Design Grade ² | Target Grade | 5% – 20% | 5% – 12% | 3% – 10% | 2% – 8% | 2% – 5% |
| | Short Pitch Maximum | 30% 50% on downhill segments only | 25% 35% on downhill segments only | 15% | 10% | 8% |
| | Maximum Pitch Density | 20% – 30% of trail | 10% – 30% of trail | 10% – 20% of trail | 5% – 10% of trail | 0% – 5% of trail |

| Designed Use BICYCLE | | Trail Class 1 | Trail Class 2 | Trail Class 3 | Trail Class 4 | Trail Class 5 |
|--------------------------------|----------------------------|--|--|----------------------|----------------------|----------------------|
| Design Cross Slope | Target Cross Slope | 5% – 10% | 5% – 8% | 3% – 8% | 3% – 5% | 2% – 3% |
| | Maximum Cross Slope | 10% | 10% | 8% | 5% | 5% |
| Design Clearing | Height | 6' | 6' – 8' | 8' | 8' - 9' | 8' - 9' |
| | Width | 24" – 36" Some vegetation may encroach into clearing area | 36" – 48" Some light vegetation may encroach into clearing area | 60" – 72" | 72" – 96" | 72" – 96" |
| | Shoulder Clearance | 0' – 12' | 6" – 12" | 6" – 12" | 6" – 18" | 12" – 18" |
| Design Turn | Radius | 2' – 3' | 3' – 6' | 4' – 8' | 8' – 10' | 8' - 12' |

¹ For definitions of Design Parameter attributes (e.g., Design Tread Width and Short Pitch Maximum) see FSH 2309.18, section 05.

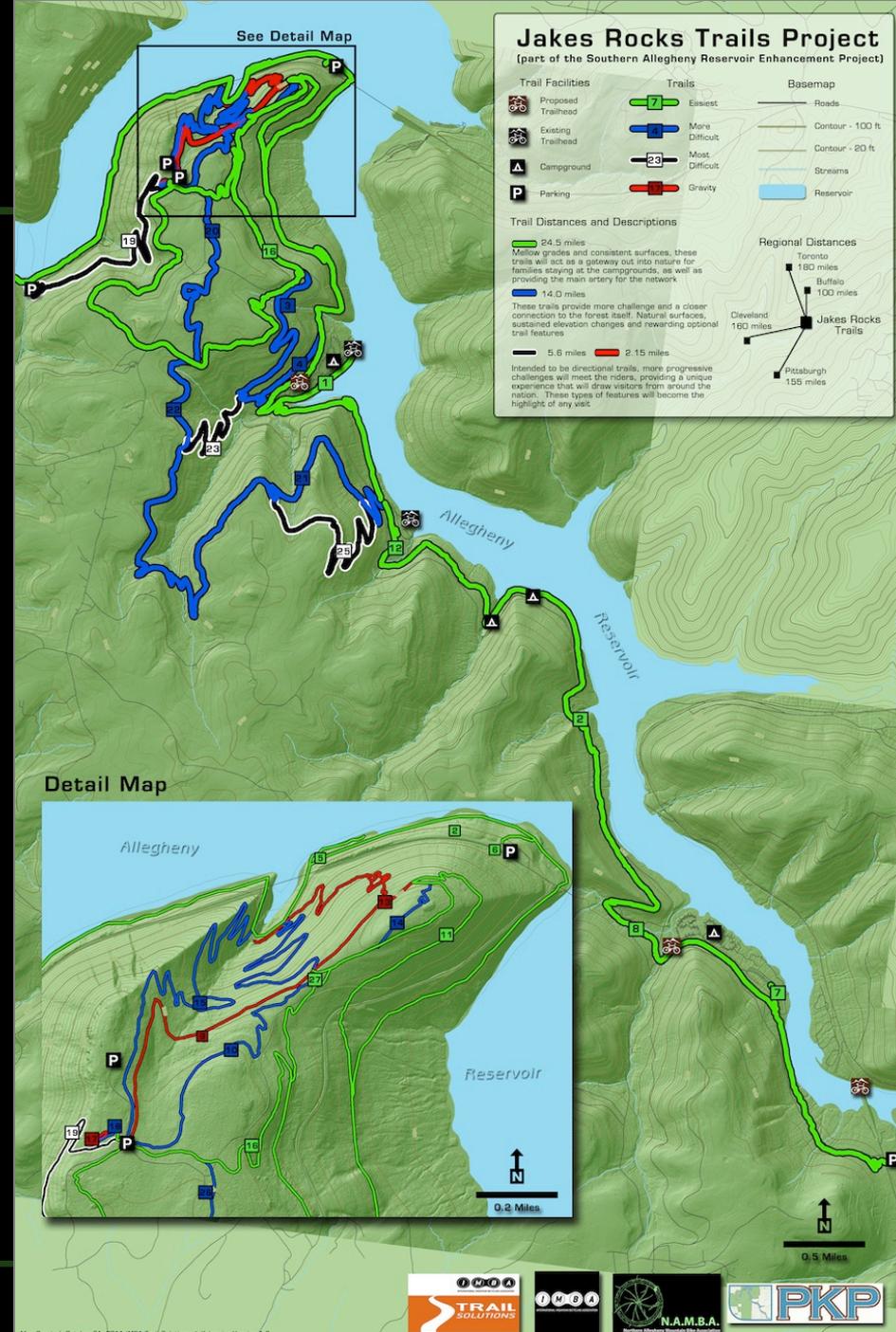
² The determination of trail-specific Design Grade, Design Surface, and other Design Parameters should be based upon soils, hydrological conditions, use levels, erosion potential, and other factors contributing to surface stability and overall sustainability of the trail.

- Classes help define trails appropriate within settings
- Skill levels
- Doesn't capture range of trail-specific experience characteristics

Jakes Rocks

Jakes Rocks Epic Mountain Bike Trail EA

- Bike-optimized trails
- Experience of trail and trail features is primary



| Segment Type | Map Label | Trail Segments (FS GIS) | IMBA Symbol | Use | Feature Frequency | Const. Tread Width | Active Tread Width | Min. Turn Radius | Exposure (without ralling) | Unavoidable Obstacles |
|--------------|---|--|---------------|------------|-------------------|--------------------|--------------------|------------------|----------------------------|-----------------------|
| Type 1 | Easlest Two-way (solid green line) | 1, 2, 5, 6, 7, 8, 11, 12, 16, 27 | Green Circle | bike, foot | Low | 48" | 36" | 10' | less the 18" | less than 2" |
| Type 2 | More Difficult Two-way (solid blue line) | 3, 4, 14, 15, 18, 20, 21, 22, 26, 28, 29 | Blue Square | bike, foot | Medium | 36" | 24" | 8' | less than 48" | less than 8" |
| Type 3 | Most Difficult One-way (solid black line) | 24, 25, 23, 19 | Black Diamond | bike, foot | High | 24" | 12" | 7' | no limit | less than 18" |
| Type 4 | More Difficult One-way (broken blue line) | 10 | Blue Square | bike | Medium | 36" | 24" | 15' | less than 60" | less than 48" |
| Type 5 | Most Difficult One-way (broken red line) | 9, 13, 17 | Black Diamond | bike | High | 24" | 12-18" | 10' | less than 120" | less than 72" |

General Notes:

Sustainable trails guidelines provide the foundation for all design + construction decisions ("half rule", frequent grade reversals, max All trails should have a minimum grade and camber (in/outslope) of 3 percent to ensure a well-drained tread.

Definitions:

Feature frequency is averaged over long distances. Per 100': "low" = 2-3 features, "med" = 3-5 features, "high" = 5-10 features.

Constructed tread width may narrow over short distances to 50 percent of spec. Examples include rock or tree gateways.

Tread width also applies to bridges and boardwalks.

Exposure is the feeling of empty space next to and below the trail tread, and provides an added psychological challenge beyond the

Unavoidable obstacles are obstacles in the trail that must be navigated or attempted without leaving the trail

Voidable obstacles are rocks, roots or other features in the trail that do not impede progress at a reasonable speed

Roughasity attempts to capture average tread coarseness. Tread area with obstacles: "low" = less than 5 percent, "med" = less th

Type 2 note - Significant unavoidable obstacles are expected. May include steps, stairs, rock gardens, loose rock, and significantly e

Type 3 note - Rocky areas may exist and should be sought out. Selective machine work to create very organic appearing rock strew

Bike-Optimized Trails

- What are bike optimized trails?
 - Trail design and features optimized for bikes
 - Preferred use, not necessarily single-use



How can the GQTE be of value to your trail planning?



Questions?



Resources

IMBA Website: imba.com

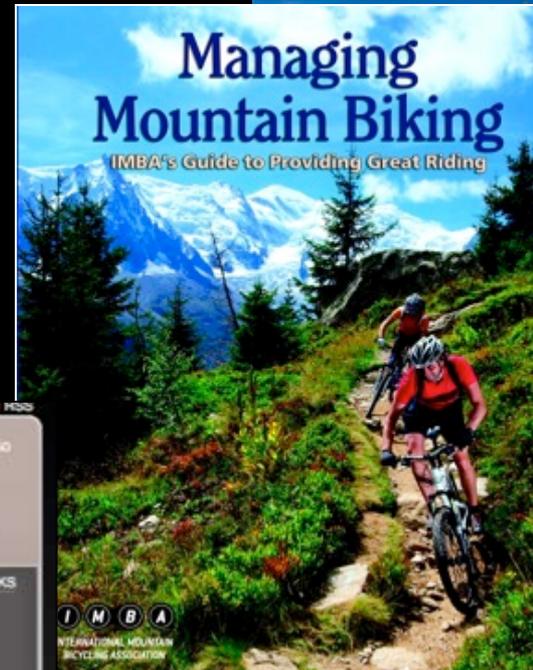
IMBA Books: Trail Solutions

Bike Parks

Managing Mountain Biking

Trail Solutions

IMBA's Guide to Building Sweet Singletrack



Laurel Harkness

CA / HI Region Director

Laurel.harkness@imba.com

A screenshot of the IMBA website's 'Grants and Fundraising' page. The page header includes the IMBA logo and navigation links for 'ABOUT IMBA U.S.', 'EVENTS', 'INTERNATIONAL', 'PARTNERS', 'PROGRAMS', 'RESOURCES', and 'SUPPORT IMBA'. The main content area is titled 'Grants and Fundraising' and includes a 'View' button. The text describes various grant opportunities, such as those for local organizations, in-house grants, 'Bikes Belong', the 'Specialized Dealer Grants' program, and foundations. A 'RELATED LINKS' sidebar on the right lists categories like 'ADVOCACY AND ORGANIZING', 'BIKE PARKS AND FREE-RIDING', and 'GRANTS AND FUNDRAISING', with specific grant programs listed under the latter.





Thank You!

Laurel Harkness

CA / HI Region Director

Laurel.harkness@imba.com



Buena Vista, CO

