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Assessment of Freeride Mountain Biking Opportunity at Moran State Park

**By Evergreen Mountain Bike Alliance
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Introduction to Evergreen Mountain Bike Alliance:

Evergreen Mountain Bike Alliance is Washington State's largest mountain bike organization. Created in 1989 as a grassroots response to local trail networks closing to riders, Evergreen (formerly BBTC) is now a statewide 501(c)(3) nonprofit organization whose proactive mission is to create and protect sustainable mountain biking opportunities in Washington. We focus on education, advocacy, maintenance and recreation and believe in building common ground with other user groups and fostering a culture of volunteerism.

Evergreen has built two large, public, mountain biking parks incorporating both trail riding and freeriding: I-5 Colonnade Park and Duthie Hill Mountain Bike Park. With a paid staff of five employees providing professional leadership Evergreen now directs volunteer trail building and maintenance work totaling almost 10,000 hours annually on public lands across the state. Learn more at www.evergreenMTB.org

Introduction to Freeriding:

Freeride mountain biking refers to a riding style incorporating both man-made and natural trail features such as steep rock faces, drops, jumps, and sometimes wooden structures. Freeriding is a fast growing element of the sport of mountain biking and although far smaller in number of participants than the more familiar cross-country or trail riding it is also a user group which has extremely limited access to authorized trails. For example, until the construction of Colonnade Park and Duthie Hill Park the nearest legal freeriding from Seattle was two hours north, or four hours south, or five hours east.

The pressure for freeriding opportunities has led to the building of unauthorized trails on public or private property; at times without sufficient attention to the impact to resources or sustainability. Due to the need for secrecy these trails were unsigned, leading to potential hazards for insufficiently skilled cyclists who may happen upon them. In addition, because the builders knew that unauthorized trails could be destroyed at any time there may have been no effort made to incorporate elements which would allow the trail to appeal to a larger cycling audience such as options for riding around most difficult features or incorporating progressive skill building into the trail.

Moran State Park and Freeriding:

At the invitation of park staff the Evergreen Executive Director and Project Manager came to Moran State Park in February 2011 to review an existing, authorized trail which is open to mountain bikes under a seasonal restriction. At issue was the existence of unauthorized, technical trail features, including manmade jumps and drops, in or alongside the trail which were built to create a challenging freeride experience for skilled riders. We viewed the entire length of the current trail, inspected technical trail features, met with park staff and trail builders, discussed the objectives of the trail and identified design restrictions including private property, high-usage hiking trails, and areas where the terrain under the power lines become excessively steep.

When assessing an area for a technical mountain bike trail the following must be considered: sustainability, risk management, suitability for intended rider experience, and skill building opportunity.

This document summarizes our assessment of the potential for upgrading and authorizing technical trail features on the current mountain bike trail under the power lines on the far west side of Moran State Park. General guidance is also provided for incorporating appropriate risk management techniques. The trail would incorporate natural and man-made features to provide a challenging and unique riding experience for Orcas Island and the only authorized freeriding in the San Juan Islands.

Opportunity:

Create a freeride mountain bike trail which, for much of its length, follows under existing power lines on a previously cleared alignment that would provide:

- An environmentally sustainable footprint
- Appropriate risk management techniques to best ensure liability protection under the Washington State "Recreational Use Statute", RCW 4.24.210
- A legitimate and technical challenging trail
- A place for riders to progress and build technical skills
- An attraction for Orcas Island and specifically Moran State Park
- A community project to bring riders together to volunteer
- A year round mountain biking trail on Orcas Island

Proposed Location and General Conditions:

The figure below shows the approximate location of the existing trail.



The following photographs are taken along the existing mountain bike trail and are indicative of the general land condition for this area. As can be seen, the area is unforested, lightly vegetated, and has a surface of often heavily compacted soils from vehicle traffic. The soil is generally mineral with very little surface organics.





Near the bottom of the trail there are two issues which should be addressed to create a safe, sustainable riding experience and to reduce the potential for conflict with other park users. The first is that the existing, authorized, trail becomes excessively steep, what is generally referred to as "fall-line", which results in a poor riding experience and safety hazard as controlling speed on this loose section is difficult. The higher level of usage that a technical trail will draw would eventually lead to an environmentally unsustainable trail as well. A photograph of a section of this steep trail is below. The start of "trenching" on this trail is visible in the photo and is caused by the combination of human use (both bicycle and boot) and water drainage on an overly steep, poorly designed trail.

The second issue is the termination of this trail into the Cold Springs Trail for the final connection to the road at Cascade Lake. In general Evergreen advocates for the sharing of trails with all non-motorized users, knowing that appropriate education and design techniques can keep user conflict to an acceptable level. In this case though the potential for conflict from introducing freeriders onto a heavily used trail which has poor sight lines is probably higher than would be desired.

The solution to both of these concerns is the development of a new section of trail down to Cascade Lake. Appropriately built trail will ensure sustainability, reduce the opportunity for conflict, and greatly enhance the riding experience. It was clear from our investigation that the terrain can easily support new trail following near but not on the existing section of trail and then extending the final distance to the road.



Key Success Factors for Freeride Trails:

1. **Sustainability** – make it last by building with the environment, users and user expectations, and ongoing maintenance and erosion in mind.
2. **Risk Management** – design and build it using risk management best practices.
3. **Features** – make it fun by offering a variety of mountain bike specific trail features such as flow, berms, jumps, drop-offs and steep rock rolls that are connected together in a flowy succession.
4. **Progression** – make it challenging with features of varying difficulty levels and opportunities for riders to build skills.

1) Sustainability

Books have been written on designing and building sustainable trails. We can't go into all the details here, so we just list key sustainability concepts and explain how well this particular terrain (the area under the power lines and in the adjacent woods) will hold up.

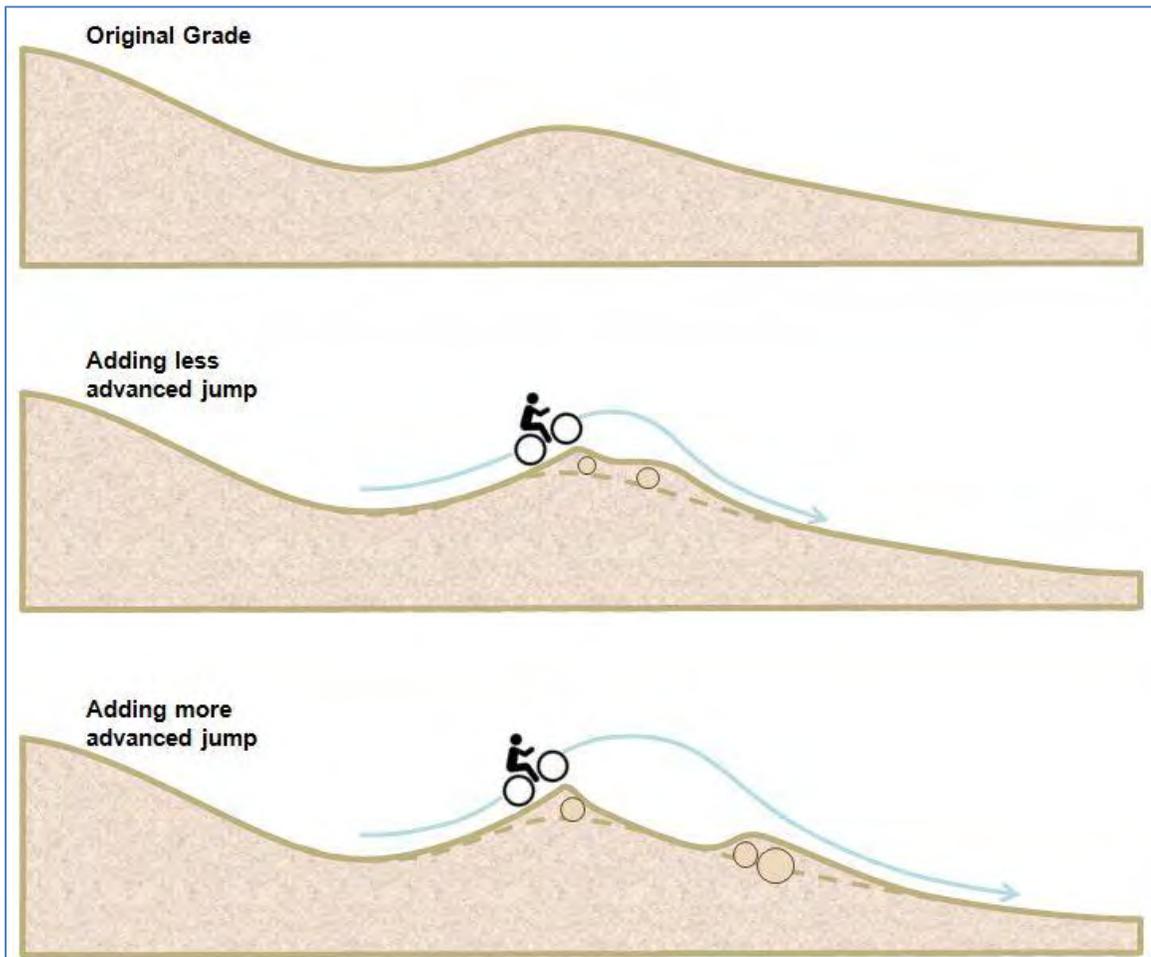
Core elements of designing and building sustainable trails:

- A. Impact on the environment
- B. User needs and expectations
- C. Ongoing maintenance

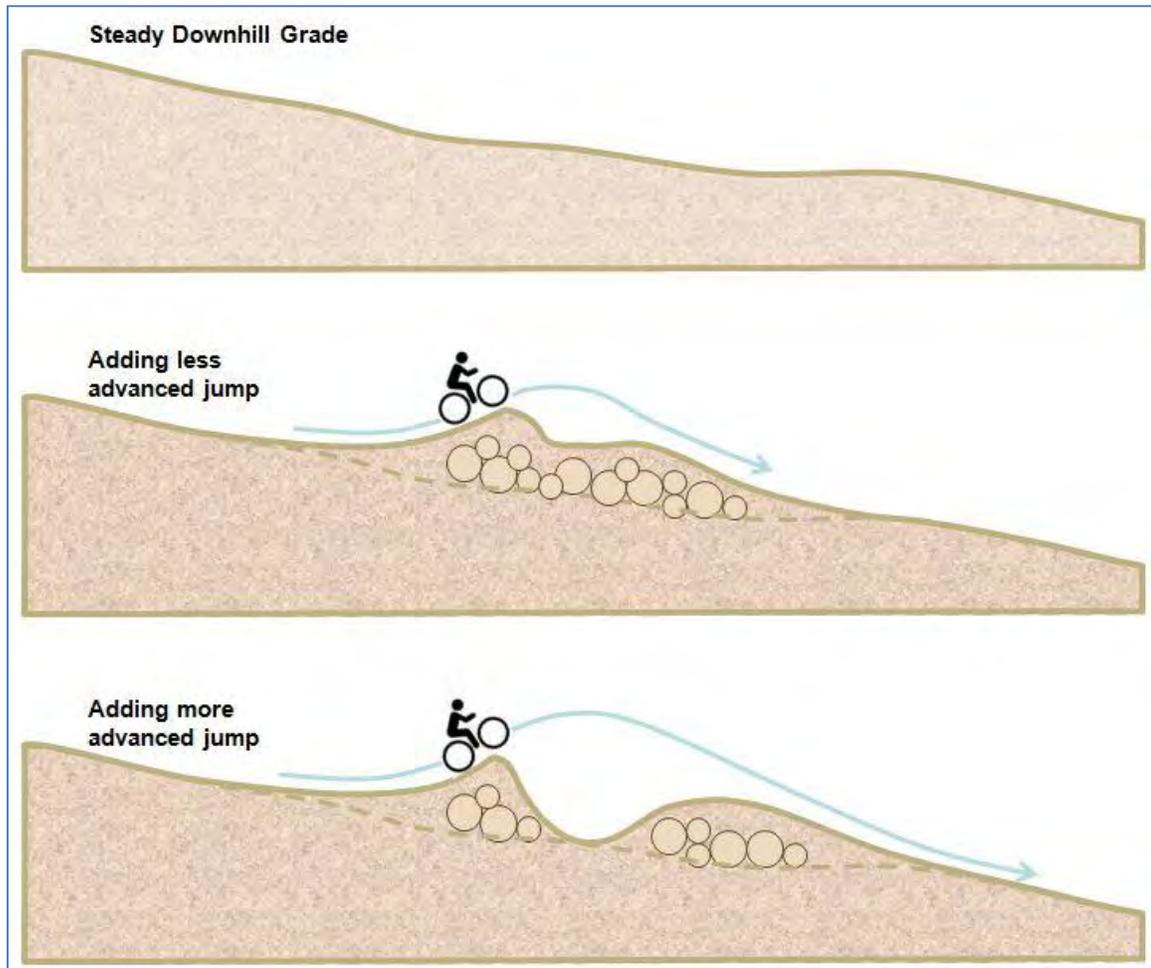
A. Impact on the environment

- Already cleared and maintained power line right-of-way, essentially a road

- Adding trails and features to naturally steep rocky terrain means minimal impact because soil erosion is not a concern when riding on rock.
- Natural rocky slopes and rock outcroppings that exist under the power lines provide challenging riding features which in many cases will require minimal human modification.
- Natural grade reversals enable building features with far less impact. The following diagram shows an example of the minimal impact caused by building features on the type of terrain under the power lines:



By contrast, the following diagram shows how building a feature on a steady downhill grade may require building up a significant amount of dirt and log/rock fill to create a take-off and landings:



B. User needs and expectations

- This trail does not provide views or serve as a connector for view trails. For that reason it currently sees very little usage by hikers or cross country mountain bike riders. This is important as the high-speed nature of freeriding makes it incompatible with significant numbers of walkers or slow-speed riders. Proper signage will serve to alert all trail users to the nature of the trail and will further reduce any potential conflict.
- Would be extremely popular with mountain bikers and open up Moran State Park to a whole new user group, freeride bikers, as long as built with the appropriate features to provide the desired freeride experience.
- Abundance of rock and local material available for building features which will fit the aesthetic of the park.

C. Minimizing ongoing maintenance

The rocky terrain with natural grade reversals that exists under the power lines lends itself very well to building trails there require minimal ongoing maintenance.

Key sustainability concepts

Control of erosion caused by water:

- Natural grade reversals will shed water at regular intervals
- Jumps and other features also add grade reversals to break up water flow
- Naturally rocky terrain facilitates shedding water
- Features that use rock outcroppings aren't impacted by water
- Rocky terrain and rock features are often more ride-able and fun in wet weather
- Outsloping and the "Half-rule" techniques will be applied to keep water shedding off of the trail

Control of erosion caused by usage:

- Turns and berms will be implemented to maintain flow and reduce skidding and hard braking that can cause erosion on dirt surfaces
- There is an abundance of natural rock available to armor steeper sections and help retain features (would otherwise be potentially erosion prone with an all dirt surface)
- Features like jump take-offs and berms that are used over and over again can be armored with rock or man-made landscaping materials such as pavers or turf stones. The following is an exaggerated example of an armored berm at a bike park that receives constant traffic :



Note: dirt landing zones for high speed jumps are one feature that should generally not be armored with rock or pavers. As a result, they will require regular maintenance to keep them safe.

Keeping users on the trail:

- Because mountain bikers can't ride their bikes off trail, they don't tend to wander off the trail or braid trails
- Ride-arounds should be provided for difficult features, as well as walk-up paths for users wanting to session a feature over and over again.

2) Risk Management

The following is a description of the key risk management techniques and best practices to consider when designing and building mountain biking trails with natural and man-made features. Much of this information is copied or derived from the International Mountain Bike Association's (IMBA) "How to Design Challenging Trails" manual. Evergreen has used these

techniques successfully at both Colonnade Mountain Bike Park and Duthie Hill Mountain Bike Park, public owned parks property of City of Seattle and King County respectively.

- Build trails according to established ***Trail and Feature Guidelines***. Trails, natural features (such as steep rock rolls and rock drops) and man-made features (such as jumps and berms) must be durable, predictable and designed to moderate the risk of injury when riders fail to negotiate them properly.
- Emphasize ***Skill Instead of Consequence***. Challenging features don't have to be overly dangerous. There is risk inherent in all styles of mountain biking but appropriate design removes unnecessary dangers. For example, ensuring that the landing zones of jumps are smooth and free of obstacles does not reduce the risk inherent in failing to land correctly but in that case it does avoid introducing the added danger of impacting trees or logs.
- Provide ***Options and "Ride-Arounds"***. When building features, offer easier options and routes that avoid the feature whenever possible. Build features and challenges that are appropriate for the skill level of the trail. Provide opportunities for a variety of skill levels.
- Build skill ***"Gateway Filters"***. Entrances to difficult trails and features should be made challenging. These gateways will cause inexperienced riders to avoid the trail or dismount early on a feature, before the feature is high above the ground where the rider is more likely to be injured should a fall occur. This will reduce the risk of less skilled riders attempting a trail or feature that is beyond their ability.
- Provide appropriate ***Fall Zones***. Clear hazards from areas where riders are likely to land from a fall.
- Build ***"Choke Points"***. Narrow, difficult and very visible features that will slow riders down before a higher risk area. Choke points are built close to the ground with safe fall zones in case of a fall.
- Design ***Proper Flow*** into trails. Avoid abrupt transitions from open and flowing to tight and technical.
- ***Eliminate Surprise***. Provide clear site lines and don't surprise trail users with unexpected technical trail features. Challenging trails should be properly signed. Make sure that riders can see technically challenging trail sections well in advance. The most difficult section of a feature should be made visible from the entry. By placing the difficult section in view, the rider can make an informed decision before they may get into difficulty with a feature that may be beyond their ability.
- Mark trails and TTFs according to established ***Sign Standards***. Trailhead signs can provide general information about trails and features, but their highest priority is to alert riders to the difficulty level and technical challenges on the trail ahead.
- Eliminate ***Hazards*** or identify them with signs. Dangerous rocks or stumps in higher speed zones or potential fall zones should be removed. If a potential hazard exists that can't be removed, such as a nearby cliff or fence, *and* the trail can't be routed away from it, choke points should be implemented to control speed and the hazard well signed.
- ***Educate*** riders. The Evergreen Mountain Bike Alliance and partners will offer various mountain bike boot camps, classes and technical riding skills clinics. Information on biking etiquette and how to reduce user conflict should also be posted.

Gap jumps and risk management. Although filling gaps and adding case guards reduces the risk of a severe injury resulting from a rider attempting the jump with too little speed, it will increase the number of riders on the jump and lower the overall skill level of those riders. As a result, a decision needs to be made as to the target skill level of the desired riders on that jump, and designing accordingly. Case guards and table-tops will provide progression opportunities

and they will open up the features to a greater audience, but the number of accidents will also go up. Signage and other risk management issues need to be considered together.

Signage. Signs are a necessary component of trail management, especially for trails with natural and man-made features and options. They provide the rider with information that will allow them to make an informed and educated choice. Two types of signs will be used:

Trailhead signs are necessary to inform the rider of the trail technical difficulty and conditions expected, as well as park rules and emergency contact info. Examples:



En-Route signs will be along the trail to give warning of the difficulty of an upcoming TTF when that TTF is rated higher than the overall rating of that particular trail.

Examples:



3) Features

The cleared terrain under the power lines is ideal for a challenging and fun trail full of natural and mad-made features. There is an abundance of rock, short steep sections of terrain and natural grade reversals that are nearly ideal for creating features and simultaneously managing drainage

and erosion concerns. Below are some, but certainly not all, of the features that are commonly incorporated into freeride trails:

Berms and “Flow”. A key measure of trail quality is flow. Riders can experience flowy trails with a relatively steady speed and pedaling cadence. That means flowing around turns without having to hard-break into the turn and hard-accelerate out of the turn. Berms, or banked turns, are one the key features that makes flow possible.



Jumps. Some of the most popular trail features at any park or freeride trail are jumps. There are many styles, such as Table-Tops, Step-Downs, Step-Ups, Gap Jumps, Hip Jumps, but all involve the rider using forward speed to launch upward into the air:



Drop-Offs. The characteristic that distinguishes a drop-off from a jump is the take-off angle. A drop has a flat or negative take-off angle, so sends the rider downward. The two require different skills and technique. Many opportunities for rock drop-offs exist naturally under the power lines.



Steep Rock Rolls. Steep rocky terrain provides many opportunities for fun and technically challenging trail features. The steep rock roll is a great skill builder and a common natural feature on backcountry trails.



4) Progression

Fun features will attract riders to the trail, but progression and skill building opportunities will keep riders coming back. The following are key techniques for offering and facilitating progression on a trail:

Side-by-Side Options. Provide side-by-side more and less difficult options as well as a “ride-around” (a way to bypass the feature altogether). The GLC Drops at Whistler is an excellent example:



The same concept can be applied to jumps and steep rock rolls.

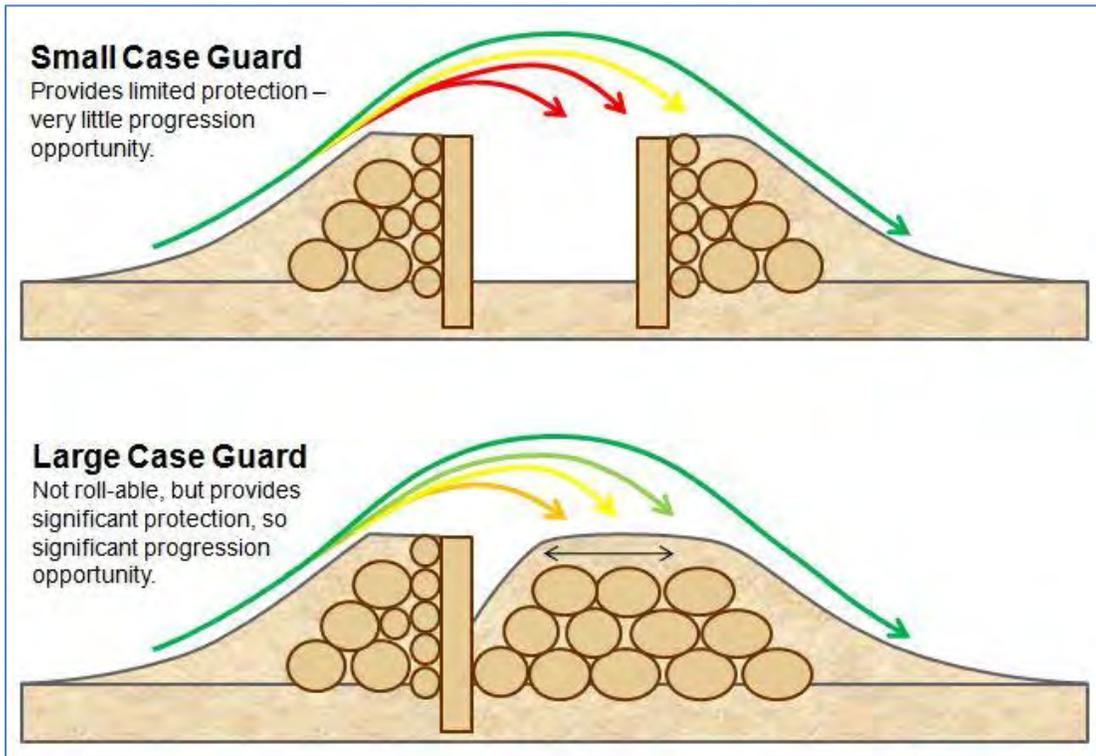
Introductory Features & Skill Zones. Although the Whistler GLC drops concept is an excellent example, there are still many experienced cross country riders who will be intimidated by the first blue level drop. To address that audience introductory features or skill zones can be added earlier on the trail. An example is the beginner drop zone at the Duthie Hill Mt Bike Park, which range from 6 inches to 3 feet tall:



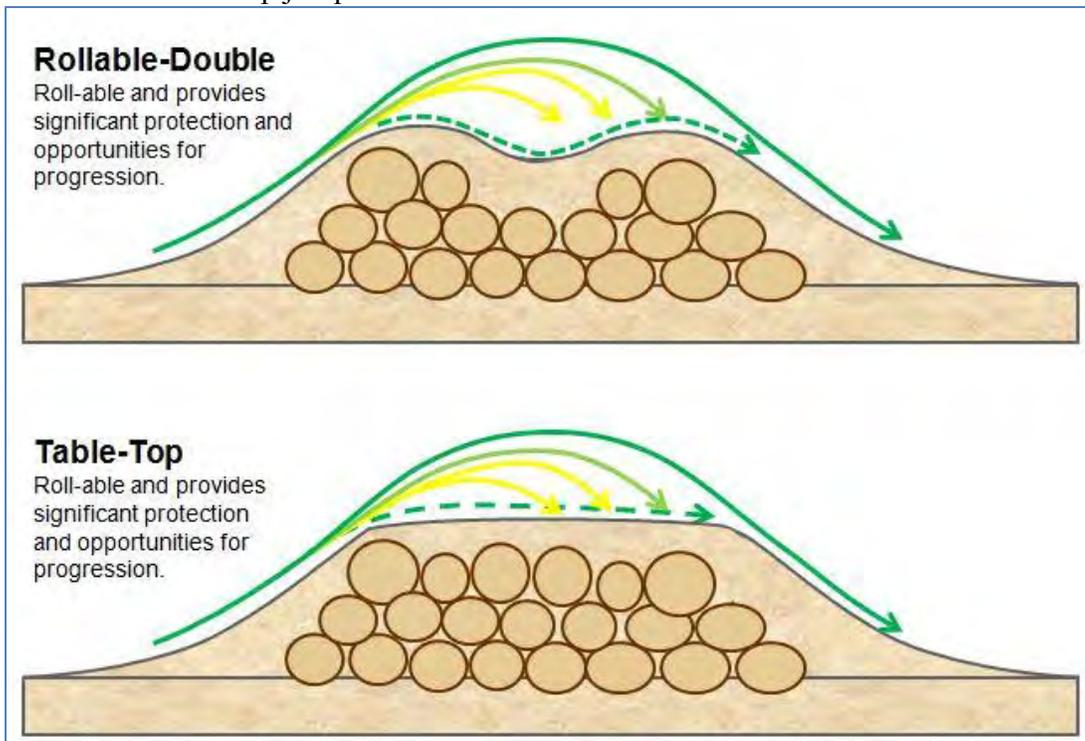
Gaps, Case Guards, Roll-able Doubles & Table-tops. The easiest jump to build but most difficult to learn on is the gap jump. A separate take-off and landing are built and the rider must carry enough speed to clear the gap between the two.



To provide some progression opportunities, an extension to the landing zone may be added. Called “case-guards”, they shorten the gap in case a rider isn’t carrying enough speed. Case guards vary in length and style:



To provide additional progression opportunities, the gaps can be filled to make roll-able doubles and table-top jumps:



The decision on what type of case-guard and jump is implemented is not just an issue of progression, but is tied significantly to risk management and sustainability. Although it may seem counterintuitive the gap jump is not necessarily the highest risk option and it needs to be assessed in conjunction with the intended audience for that particular jump.

Summary of Recommendation for Freeride Trail at Moran State Park:

As stated earlier, part of Evergreen's mission is to advocate for mountain biking opportunities in Washington State. However we take this as a long-term objective and our desire to provide opportunities does not blind us to the impacts to the reputation of Evergreen and the larger mountain biking community if we are not careful in our recommendations.

In the specific case of the evaluated trail on Moran State Park we believe that the location can easily meet all of the requirements for a sustainable freeride trail.

Specific recommendations are:

- 1) Begin communicating with the local freeride, and broader mountain bike community, to ensure public involvement. This area has a motivated and skilled group of riders and builders who can be mobilized to assist in designing and building.
- 2) Implement a formal trail adoption agreement to clearly communicate expectations for building and maintenance of the trail.
- 3) Developing and implementing a signage plan to meet risk management objectives; to include trailhead informational sign and trail warning signs.
- 4) Developing a trail master plan which addresses:
 - a. Skill level of primary intended users
 - b. Skills progression opportunities to broaden the audience for the trail
 - c. Use of ride-arounds and optional features
 - d. Feature design guidelines to mitigate hazard
- 5) Identify a trail alignment for a new section, as discussed above, which avoids the current fall-line and bypasses the Cold Spring Trail.
- 6) Assess the potential for opening this trail to mountain bikes on a year-round basis. Currently the public access to the start of this trail is via another trail which is seasonally closed to mountain bikes and which sees high hiker use during the summer. To minimize the potential for conflict this trail should remain on a seasonal closure and creation of an alternate trail to the west side of the private property (antennas) should be investigated.

Evergreen has experience and proven success in this process and we are ready to assist both Washington State Parks and the local riding community in any way that we can.