

SkiBowl Snowmaking Infrastructure Improvement Project

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Background

Mt. Hood SkiBowl is a Ski Area on National Forest System lands under Special Use Permit. The ski area owns and operates the infrastructure in order to provide the services under their permit. Antiquated technology and dynamic environmental conditions create a need for regularly improving the infrastructure so the ski area can adapt to modern conditions.

SkiBowl permit boundary is located with the A11-Winter Recreation Area land use allocation. The goal of A11 lands is to “provide areas for high quality winter recreation (and associated summer) opportunities including: downhill skiing, Nordic skiing, snowmobiling, and snowplay within a natural appearing forest environment” (Forest Plan, page 4-190.)

Purpose and Need for Action

The overall purpose of this project is to upgrade the current snowmaking infrastructure. Snowmaking is a vital to a ski areas success because it allows the operators to add snow during low precipitation weather cycles, add surfaces area in high traffic areas, supplement low elevation snowpack when temperature are cold, and increase surface area for peak use. As such, there is an underlying need to construct modern snowmaking infrastructure which is more efficient, more reliable, and creates a better product. The new system will utilize water which is stored in a reservoir so it can be pumped at a high rate.

Proposed Action:

- Prepare water line corridor by brushing and removing vegetation
- Trench corridor using an excavator to 36’’ deep and using a 24’’ bucket
- Connect snowmaking infrastructure to former water treatment plant which will be used as a reservoir as a bulge in the system,
- Lay needed infrastructure waterline infrastructure at 36’’ deep then backfill and install electrical infrastructure into trench at 24’’ and install hydrant locations where needed.
- Backfill trench
- Follow wet and dry season BMPs
- Restore site using BMPs and Project design criteria

Equipment:

- Komatsu Pc 200 excavator with 24’’ digging bucket for trenching
- Takeuchi 135 Mini-excavator with 36’’ bucket for backfilling
- Bobcat 763 Skid Steer with tracks for backfilling and transporting material as needed
- Caterpillar 966 front end loader for lading bedding material into a dump truck
- International 5 yard dump-truck for hauling material on/off-site

Follow all project design criteria for each of the following:

Botany: cleaning all equipment (e.g., dump trucks, tractors, excavators) thoroughly with pressurized water before it enters national forest land; using weed-free rock sources (there is no

such thing as a weed-free source; rock sources are relatively clean or either infested with invasive plants); using wood strand (= wood straw) or certified weed-free vegetable straw for erosion control and restoration.

Fisheries: Ensure that draft sites meet the requirements of the Water Right Permit (Appendix C)

Heritage: None known heritage concerns

Hydrology:

The Project would occur in the dry season (June 16th - October 14th); Earth Disturbing activities would be suspended if there is more than one inch of rain in a 24-hour period at the log creek remote access weather station and/or the Bull Run River above the reservoirs exceeds 200cfs; operations would remain suspended until the Bull Run River drops below 200cfs; Construction Activities for the season would be suspended if soil moisture is recharged and stream flows rise above base flow levels and are predicted to stay above base flow levels (i.e. 200cfs in the Bull Run River, upstream of the reservoirs (Appendix B)

Wildlife: If any active bumblebee nest site is discovered along the proposed pipeline route, a Forest Service Permit Administrator or his/her designee would be consulted and measures of avoidance at the site would be negotiated.

Appendix A-Map

SKIBOWL SNOWMAKING INFRASTRUCTURE PROPOSAL



Appendix B

Best Management Practices for Soil Disturbing Actions during Dry Season Conditions (June 16th – October 14th)

Important Note: These Best Management Practices (BMP's) apply to those projects which will be completed during the “dry” season period (June 16th – October 14th). You or your contractor must contact the Forest Service 48 hours before beginning work to allow us to be present during the project implementation.

Please contact us by email at the following addresses: gwanner@fs.fed.us; tparker@fs.fed.us; karendt@fs.fed.us.

Rules for Proceeding with Ground Disturbance

The ground disturbance work will only proceed when ground conditions are suitable. The intent is to minimize sediment impact in critical riparian areas with highly sensitive species.

1. **You are not authorized to proceed until an appropriate weather window exists.** You are required to check the following sources of information to determine when an appropriate weather window exists:
 - a) **You are not authorized to begin the project** if the National Weather Service¹ predicts a 50% or higher chance of more than one inch of total of precipitation during the entire project timeline, or when streamflow at the Bull Run River gaging station² exceeds 200 CFS on the start date of the project.
 - b) For a project timeline lasting more than 2 days, you must supplement the National Weather Service's forecast by using NOAA's Ready Meteogram³ to determine the long term weather outlook. Follow these steps on the website for precipitation information:
 1. Latitude = 45.34, Longitude = -121.94
 2. Choose GFS Model (1 degree, 192-384h, 12 hrly)
 3. Leave the default of 12 UTC/today's date
 4. Choose 12 hr Accumulated Precipitation for the graph.

You are not authorized to begin the project if more than one inch of total rainfall is forecasted during the project timeline.

¹ <http://forecast.weather.gov/MapClick.php?lat=45.32970&lon=-121.91&unit=0&lg=english&FcstType=graphical>

http://waterdata.usgs.gov/or/nwis/uv?cb_00065=on&cb_00060=on&format=gif_default&period=21&site_no=14138850

³ <http://ready.arl.noaa.gov/READYcmet.php>

- c. **You are not authorized to begin the project** if the Log Creek Weather Station⁴ shows more than one inch of rain has fallen in the last 24 hours. If Log Creek Weather Station is not operational use South Fork Bull Run Weather Station⁵.
 - d. **You are not authorized to begin the project** if the project cannot be completed with all proper erosion measures in place at least 24 hours before a prediction of at least one inch of precipitation.
2. In the event that the weather changes and more than one inch of rain is predicted by the National Weather Service (see details above) during project construction, the project must be suspended and all spoils or fill should be covered by a tarp **or** by weed free straw **or** mulch as described below. The project may proceed only after the daily river level at Bull Run returns to below 200 CFS and less than one total inches of rain is predicted for the remainder of the project timeline.

Rules for Equipment and Erosion Measures during Construction

1. Oregon State Certified weed-free **annual ryegrass straw** or **spring wheat straw** or Woodstraw must be present on the project prior to any excavation. Disturbed areas must be mulched immediately after project completion if more than one inch of rain is predicted in the next 48 hours. For all other projects, straw or mulch must be placed on disturbed ground within 48 hours of project completion to mitigate any potential erosion into the surrounding environment. Apply Woodstraw⁶ at a rate to achieve 70% ground cover (approximately 7 tons per acre) or certified weed free annual ryegrass straw or spring wheat straw to a depth of two inches with no visible mineral soil.
2. Equipment operators must use the **minimum sized equipment** necessary to complete the job, in order to minimize ground disturbance. This is not necessarily the minimum size of equipment that a contractor owns, because a particular contractor may not own the proper size of equipment to perform minimum ground disturbing activity. Therefore, cabin owners are responsible for hiring a contractor who owns or will acquire the proper minimum size of the equipment that could accomplish the work. This includes using small excavator buckets, and hand digging trench lines where mature tree roots may be impacted or when working in a confined area. Every effort should be made to minimize impacts to existing vegetation, especially mature trees and their root systems.
3. Fill will be piled on level ground away from steep breaks in the terrain to minimize surface flow of silted rainwater run-off into nearby water-bodies. Excess fill produced by excavation should be evenly distributed on ground disturbed by the project.

⁴ <http://www.wrh.noaa.gov/mesowest/getobext.php?wfo=pqr&sid=LGFO3&num=48&raw=0&banner=off>

⁵ <http://www.wrh.noaa.gov/mesowest/getobext.php?sid=SFBO3&table=1&banner=off>

⁶ <http://www.woodstraw.com/>

4. If large boulders or downed wood are excavated or moved during the process they should be evenly distributed throughout the disturbed area to achieve a pre-disturbance “natural” look.
5. Fill and any gravel work will be compacted as much as possible to prevent erosion.
6. If specified in the design criteria, place sediment barriers prior to construction around sites where excavation spoils or erosion may enter streams or wetlands directly or through road ditches. Maintain these throughout construction and use redundant filter materials (such as straw bales or silt fencing) to reduce offsite soil movement.
7. If specified, impacted areas must be seeded **within 2 weeks of project completion with native grass** seed from the appropriate seed zone, or annual ryegrass or cereal grain seed (seed must be tested to be free of all Oregon State noxious weeds) at the specified rate in pounds per acre; and mulched. Apply Woodstraw at a rate to achieve 70% ground cover (approximately 7 tons per acre) or certified weed free annual ryegrass straw or spring wheat straw to a depth of two inches with no visible mineral soil.

Noxious Weed Prevention

1. The contractor shall clean all mud, dirt, seeds, and plants from all equipment prior to entry onto National Forest Lands at no additional cost to the Government. All equipment coming from outside the State of Oregon, including lowboys and trucks, shall be washed prior to entering the National Forest Lands.
2. Only State of Oregon Certified weed free straw, seed and mulch will be used on National Forest Lands.
1. If gravel or soil is imported from outside the project area, it should be determined to be from a source approved by the Zigzag District or the MHNF botanist as noxious weed free.

Pollution Prevention

1. All equipment operating on the site area will be in good repair and will be free of leakage of lubricants, fuel, coolants, and hydraulic fluid.
2. Place vehicle staging, maintenance, refueling, and fuel storage areas 150 feet or more from any water body. When immobile power equipment is refueled, use absorbent pads or other chemical containment devices (for example, spill containment tray with absorbent pad or a hole in the ground lined with plastic and absorbent pads) to contain spills.
3. Diaper all stationary power equipment (e.g., generators, cranes, stationary drilling equipment) operated within 150 feet of any waters of the state to prevent leaks, unless other suitable containment is provided to prevent potential spills from entering any waters of the state; and,
4. An adequate supply of materials (such as straw matting/bales, geotextiles, booms, diapers, and other absorbent materials) needed to contain spills must be maintained at the project construction site and deployed as necessary.

5. Operators shall take appropriate preventive measures to ensure that any spill of oil, oil products, or other hazardous material does not enter any stream or other waters of the United States or any of the individual States. In the event of such a contaminant spill the operator will take all reasonable action to contain same.
6. All contaminated soil, vegetation and debris shall be removed to approved locations off National Forest lands.

In the event that petroleum products, chemicals, or any other deleterious materials are discharged into state waters, or onto land with a potential to enter state waters, the discharge shall be promptly reported to the Oregon Emergency Response Service (OERS, 1-800-452-0311). Containment and cleanup must begin immediately and be completed as soon as possible.

If the project operation causes a water quality problem which results in distressed or dying fish, the operator shall immediately: cease operations; take appropriate corrective measures to prevent further environmental damage; collect fish specimens and water samples; and notify DEQ, ODFW, NMFS and USFWS as appropriate.

Appendix C- Water Rights and Fisheries requirements

The specifications below are given primarily for the protection of juvenile trout and anadromous salmonids in waters where they are known to exist; but they also may be applied to protect a host of other aquatic organisms as well. In addition, they provide sufficient in-stream flows for life support of the aquatic ecosystem and for other important recreational and commercial uses.

Operating Guidelines.

1. The use of the water right is from December 1st and April 30th of each year.
2. Prior to any water diversion, Skibowl shall furnish, install, and maintain a screen over the pump intake to prevent injury to juvenile fish. The screen shall be constructed, installed and maintained to ODFW specifications which are described below in detail, but summarized here: Screen Mesh must be in good repair and present a sealed, positive barrier- effectively preventing entry of the “design fish” into the intake. The design fish in this case is an immature (20-30mm) salmon or trout fry. The intake structure shall be designed to promote uniform velocity distribution at all external mesh surfaces to prevent entrainment of juvenile fish against screen. The screen mesh size shall be:
 - i. Round openings - maximum 3/32 inch diameter (.09 inch)
 - ii. Square openings - maximum 3/32 inch diagonal (.09 inch)
 - iii. Slotted openings - maximum 1/16 inch width (.07 inch)

3. The Pumping rate shall start slow and gradually increase to the maximum amount (0.3 cfs) to allow rearing fish to adjust to the reduction in flow (at least 30 minutes shall elapse from start to maximum pumping).
4. SkiBowl shall maintain a bypass flow of 4.0 cfs of water in the natural channel of Camp Creek, downstream from the point of diversion, in order to maintain fish populations using Camp Creek affected by the project. The flows shall be measured within 50 feet downstream from the pumping site through use of a calibrated staff gauge installed and maintained by Ski Bowl to Oregon Department of Fish and Wildlife specifications. In addition the right is subject to the following streamflows necessary to support recreation, fish and wildlife uses in the Sandy River.
 - a. 1500 cfs in December,
 - b. 1900 cfs in January and February
 - c. 2000 cfs in March through May; and
 - d. 1500 cfs for whitewater boating and angling for the period when such use is most prevalent and not otherwise limited by other naturally occurring flows.
 - e. The Sandy River flows will be measured at USGS gage 1414250, Sandy River below Bull Run River near Bull Run, Oregon
 - i. http://waterdata.usgs.gov/or/nwis/uv?site_no=14142500
5. The use granted herein may be made only at times when sufficient water is available to satisfy all prior rights, including rights for maintaining instream flow.
6. SkiBowl shall keep a log with the following information: Date, Time, Pump Rate, Filling Time, Screen Cleaned (Y or N), Screen Condition, Downstream Gauge Height, USGS Sandy River Flow, Comments. The logbook will be available for review by the permit administrator during the pumping season and end of season report/copy shall be sent to the Zigzag District Ranger and/or permit administrator.

ODFW FISH SCREEN SPECIFICATION

The screen mesh size shall be (see Photo A below):

- i. Round openings - maximum 3/32 inch diameter (.09 inch)
- ii. Square openings - maximum 3/32 inch diagonal (.09 inch)
- iii. Slotted openings - maximum 1/16 inch width (.07 inch)

Screen Design: Water drafting screens may be off-the-shelf products, but they are often custom-made devices appropriate to the scale and duration of pumping operation. To keep the screen supported and correctly positioned in the water column, adjustable support legs are advised (see photo C below). Screen geometry can be configured either as rectangular or cylindrical, i.e.- as a shallow “box-shape” or tubular. The intake structure shall be designed to promote uniform velocity distribution at all external mesh surfaces. This can be accomplished with a simple internal baffle device that distributes the flow evenly across the entire surface of the screen (see photo A & B below). In order to accomplish this, the designer needs to understand the hydraulic characteristics of these devices. There is a tendency for most of the intake water to enter the screen near the hose end, so a typical internal baffle would consist of a pipe (or a manifolded set of pipes) which have variable porosity holes at predetermined spacing. We recommend starting near the hose end with approximately 5-10% average open area, and gradually increasing the porosity toward the length of the screen. At a point where screen length exceeds three times the diameter of the suction hose, the baffling effect tends to diminish rapidly. At this point the baffle porosity may approach 100%. A successful baffle system will functionally distribute flow to all areas of the screen. A poorly designed screen may result in high-velocity “hot spots,” which could lead to fish impingement on the screen face. Hydraulic testing of prototype screen designs is recommended where the application is on-going and extensive.

Screen approach velocity for passive pump screens shall not exceed 0.2 fps or 0.06 mps. The wetted screen area in square feet is calculated by dividing the maximum water flow rate by 0.2 fps. Pump rate must be less than 3 cfs. * Passive pump screens are only allowed where there is insufficient depth in the water body to operate a self-cleaning pump screen.

Screen Structure: The screen frame must be strong enough to withstand the hydraulic forces it will experience. However, structural frames, braces, and other elements that block the flow, change flow direction, or otherwise decrease the screen surface area should be minimized.

Screen Cleaning: The screen shall be cleaned as often as necessary to prevent approach velocity from exceeding 0.33 feet per second. Operators should withdraw the screen and clean it after each use, or as necessary to keep screen face free of debris. Pumping should stop for screen cleaning when approximately fifteen percent or more of the screen area is occluded by debris. A suitable brush shall be stored onsite for this cleaning operation. If the operator notes (a) impingement of any juvenile fish on the screen face or (b) entrainment of any fish through the screen mesh, he/she should stop operations and notify the permit administrator or ODFW.