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Troy Hudson
Golden Nordic Ski Club
Golden, B.C.
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June 27, 2009

Dear Troy,

RE: Overview fisheries Impact assessment and recommendations for impact minimization of proposed stadium, parking, and Daylodge development at Dawn Mountain

Carolla Environmental was requested by the Golden Nordic Club to review preliminary design drawings of the above expansion in the vicinity of the stadium area. The proposed development consists of leveling the land for creation of a stadium area, land clearing for the purpose of creating up to 120 parking stalls, and construction of a Daylodge, Timing shed, and maintenance shed for the grooming equipment. In addition, the road to the stadium will be upgraded by KHMR, which will involve one significant stream crossing.

On Friday June 19, a site visit was made to look at the area where the proposed construction will take place, to identify any potential impacts to neighbouring watercourses, drainage channels, and wetlands, and to provide some design recommendations.

The distance from the edge of the proposed Daylodge concrete foundation to the nearest wetland is 25m (Photo 1). This wetland is part of a beaver dam complex that feeds in to Cedar Creek tributaries (Photo 2), as well as north in to Holt Creek. This beaver pond wetland is not fish bearing. Previous fisheries studies (Enkon, 1998) and an overview fish sampling assessment that was conducted by Carolla Environmental in late August, 2007, identified fish barriers including falls and beaver dams that prevent fish from accessing this wetland.

The Enkon report demonstrated the upstream limit for fish in the Cedar Creek drainage which is in the wetlands lower on the bench near the Caribou and Moose ski trails. The Holt Creek tributary that flows out of the north end of the wetland was sampled by Electrofishing by Carolla Environmental in 2007 and was also found to be non-fish bearing. There are several gradient barriers in Holt Creek downstream of the beaver pond that prevent fish from accessing the beaver pond.

In order to exceed the minimum requirements for permanent structures near fish bearing streams identified in the Riparian Area Regulation (RAR), the Golden Nordic Ski Club has agreed to shift the Daylodge building location slightly so that the edge of the concrete foundation is 30m from the wetted edge of the wetland, rather than 25m, even through the wetland is not fish bearing. At the time of writing, there are no plans to require septic services and/or flush toilets at this facility. Although there will be land clearing required for the building of the Daylodge, the 30m distance from the wetland ensures that the riparian area around the wetland is protected and will not be impacted.

In the preliminary design drawings, the maintenance shed is situated 18m from the wetted edge of the creek flowing out of the beaver dams in the above mentioned wetland. Since the maintenance shed will house vehicles that have the potential to leak oil and fuel, it was recommended that the location of the maintenance shed be shifted further from the stream. The Nordic club has agreed to re-locate the shed to a location in the parking area that is 40m from the wetted edge of the stream.

The largest land clearing requirement will be in the construction of the 120 stall parking area near to the Daylodge. Several design recommendations were made with regards to the ditching around the parking area to ensure that any potentially silty water does not end up in nearby streams. Locations and design of ditching was discussed at the site meeting, and designs of ditch works and settling infiltration ponds should be part of the parking area design. In general, ditches should be designed to slow the flow of the water to encourage infiltration through a combination of swales, and check dams.

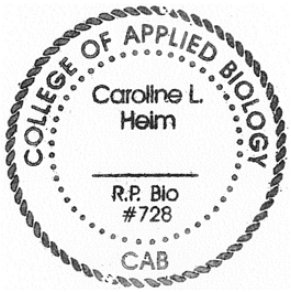
Best management practices (BMP's) as described in some detail in the "Land Development Guidelines for the Protection of Aquatic Habitat" should be followed. Some examples of BMP's that are relevant to this project include:

- Plan construction activities during dry months of the year, from early fall to snow fall period.
- Halt construction during heavy rainfall events when involved in earth moving or drainage construction.
- Minimize run-off velocities from parking area and other cleared areas by creating catchment drainage ditches with periodic "check dams" to slow water velocity.
- The interceptor drainage ditch constructed between the stadium and the parking lot should drain away from the daylodge, and should feed in to a pond beyond the parking area where silt can settle, and where water can infiltrate rather than flowing directly overland in to the neighbouring watercourse. Armouring of ditches may be necessary depending on expected flows, subgrade soil conditions, and gradient. Design specifications should be provided by an engineer.
- A shallow swale ditch should be constructed on the northeast side of the parking area. This ditch should have low slope, and should collect water flowing off the parking area during snowmelt and heavy rainfall events. Check dams should be installed in these swale areas to encourage water pooling, reduce water velocities, and encourage infiltration.

Several existing trail intersections were visited where there are multiple culverts under trails, ditches in need of maintenance, and slope failures and seepage. There areas are located just north of the development area, and will require some maintenance in order to prevent further slope erosion. A combination approach of deepening existing ditches, increasing size and depth of culverts, simplifying the drainage flows in to several main ditches and culverts rather than multiple, and armouring the eroding saturated slopes with rip rap were discussed. It is recommended that the KHMR staff engineer visit the site with the Golden Nordic Ski Club to provide expertise on specific engineering solutions to control the erosion problem and to improve drainage.

In summary, the Golden Nordic Ski Club has demonstrated flexibility in the design and location of the proposed development, and has agreed to shift the Daylodge and maintenance shed locations in order to minimize any potential for impacts to wetlands and watercourses and to riparian habitat. The entire proposed development area is located upstream of fish bearing reaches of Cedar and Holt Creeks, and the wetlands and creeks adjacent to the development are non-fish bearing. If BMP's are adhered to, natural drainage patterns maintained, and ditching and settling ponds adjacent to the stadium and parking areas be properly engineered, this development should have minimal impact to downstream fisheries resources.

Sincerely,



Caroline Heim, R.P.Bio.

References

Enkon Environmental Limited. 1998. Environmental impact assessment of the proposed golden peaks resort development, Golden, B.C. Prepared for Golden Peaks Resort Inc. Prepared by Enkon Environmental Ltd. White Rock, B.C.

Heim, Caroline. 2007. Impact assessment of trail works at Dawn Mountain at stream crossings and watercourses related to Ministry of Forests Investigation. September 2007 letter prepared for Golden Nordic Ski Club.

Land Development Guidelines for the Protection of Aquatic Habitat. Produced by the Habitat Management Division of the Department of Fisheries and Oceans, and the Integrated Management Branch of the Ministry of Environment, Lands and Parks. Second Printing, 1993.

Photo 1. Wetland located 25m from existing location of Daylodge. GNSC will shift building so that it is 30m from wetted edge.

Photo 2. Typical view of beaver ponds. Dam to the right has a 2m drop to streambed below. Further permanent gradient barriers are located just downstream of ski trail. This pond is non- fish bearing.