

## 1960 Winter Olympic Games

### Squaw Valley, California

February 18 to 28, 1960

### U. S. Forest Service Involvement

Today, the vast majority of downhill ski terrain in the United States is in the National Forests - the public forests. However, because of the land ownership patterns, the base of almost all of the major ski areas lay on private land. Many of the valleys and relatively flat lands of the federal forests passed into private ownership through homestead claims, mineral rights claims and railroad land grants.

So it was that Alex Cushing - the owner of land in the valley of Squaw Valley, California, and a long time pilot for Pan American Airways, came to apply for a permit in 1948 from the U.S. Forest Service (Forest Service, U.S. Department of Agriculture), to develop a ski area on the lands of the Tahoe National Forest surrounding the private in-holdings at Squaw Valley. Several ski areas had been developed in this manner where a private landowner controlled access to the adjacent public forest lands. This very successful public sector/private sector partnership arrangement has greatly expanded the capability to provide recreational facilities on the public lands.

The procedure developed by the Forest Service was to issue a Special Use Permit for the use of the public lands as ski terrain. The Permit was similar to a lease but reserved to the government more control of the use of the public land than a lease would do so that environmental controls can be coordinated with ski area design. Payment to the government for the use of the public lands is also provided. The procedure involved making application for the permit to the local District Ranger charged with managing that given area of national forest. Because of the size of the area needed to be placed under permit, and the consequent amount of private capital that might eventually be invested on the public lands, the permit process generally required review by successive layers of Forest Service Administration. From the Ranger it went to the Forest Supervisor - in this case in Nevada City, California and thence to the Regional Office in San Francisco. Fortunately Ranger Roy Saarni in Truckee, California and Supervisor Henry "Hank" Branagh in Nevada City were sufficiently aware of the ramifications of major ski area development that they passed the application on to the San Francisco Office with favorable recommendations.

Newly arrived in the San Francisco Office was W.S. "Slim" Davis who had extensive background in winter sports, snow safety and avalanche control having served in the U.S. Army's 10th Mountain Division in World War Two, and permit administration of several ski areas in Colorado such as Arapahoe Basin and Winter Park. He had recently been involved in granting a permit for ski area development at Mammoth Mountain on the Inyo National Forest to a local professional named Dave McCoy. Davis, who preferred "Slim" to Wilfred or Sam was to become a member of the Olympic Organizing Committee. As such he was the liaison between the Forest Service, the Organizing Committee and the California Olympic Commission whose chairman was Charles R. Blyth.

The development at Squaw Valley was still quite new and rather small when Cushing and his partner Wayne Paulsen next came to the Forest Service with the proposal that Squaw Valley be proposed to the International Olympic Committee for the 1960 Winter Games.

There were only four ski lifts (double chair lifts) and a small tram at that time. The original lift, a long, 8,000 foot double chair ran up from almost the center of the private land to near the top of Squaw Peak. The course it followed was to become the approximate location of the Men's Downhill Race Course in the Olympic Games. That Course started rather precipitously under the overhang of a large cornice of snow blown into hard ice on the top of Squaw Peak which later would feature significantly in the conduct of the Games.

A second lift - KT-22 - ran at almost right angles to the first lift and rose very steeply up a high mountain rising out of the Valley. The name came from the fact that during the original survey of the ski terrain it had taken some expert skiers 22 kick turns to get down the mountain. A kick turn was a method used to navigate terrain that was too steep and too heavily wooded to attack in a straight down the hill fashion. This area was to become the site of the Men's and Women's Giant Slalom races. Because of the zig-zag nature of a slalom race it required steep terrain in order to make it challenging.

First reaction to Cushing's proposal was that Squaw Valley simply wasn't large enough to hold the Olympics. But Cushing was a dogged salesman and was able to slowly bring people around as he pointed out that the area had the necessary vertical drop for the races, and the adequate, average snow cover and the potential adjacent cross country ski terrain for the nordic races. What was lacking was the necessary infrastructure for housing, restaurants, parking and decent access. However, there was adequate area for a Ski Village to be built to house the athletes. Other candidates for the Games were Lake Placid, Reno, and Aspen/Colorado Springs in the U.S. International candidates were Innsbruck, Austria, St Moritz, Switzerland and Chamois, France.

At this point, financing became the key to success or failure. Most of the financing had to come from the private sector. However as enthusiasm built for bringing the Games to Squaw Valley, and because there was a piece of government land in the otherwise privately held land in the Valley, the Congress of the United States passed legislation authorizing the construction of a major ice skating complex. The legislation was signed into law by President Dwight D. Eisenhower on May 15, 1958.

This was a major step because the complex, to be known as Blyth Arena, was to encompass a large ice rink for the figure skating competition, two smaller rinks for practice, and a elongated rink for speed racing. The main rink was to be partially enclosed so that the spectator seating and the ice itself were under the roof, but the south side would be open to the other rinks and to provide visual access to the opening and closing ceremonies. Heat generated from the freezing of the ice was piped into the stadium to come out of vents under the seating for 11,000 people. This innovative design provided heat for the spectators but eliminated the problem for maintaining the proper, uniform temperature on the figure skating rink itself. The speed racing oval was outside entirely which eliminated any temperature problems but required plowing any snow that fell during the Games. All four rinks were serviced by the same refrigeration plant. The Arena was awarded first prize for the Progressive Architecture Award out of over 600 entrants. Although this skating complex provided a spectacular setting for the opening ceremony, which was made most spectacular by the Disney Corporation, it would lead to troubles in the future due to the very high cost of maintenance. The original plan was to develop a state recreation area after the Games, and turn the Arena over to the private sector, to operate on a "for-profit" basis, but it was to prove simply too expensive for such operation.

## DURING THE GAMES

For the conduct of the Games, the Forest Service issued a Special Use Permit to the California Olympic Commission. Among its many responsibilities was included avalanche control during the Games and for several weeks of training before the Games. At this point in time there were only a few individuals trained in avalanche control in the entire country. They had mostly been trained at the Forest Service Avalanche School at Alta, Utah, Alta was another ski area that operated under permit from the Forest Service, and the school was part of the Avalanche Studies conducted at Alta by Monty Atwater, Ed LaChappell and Dick Anderson. Those Studies provided most of the background lore on avalanche control at that point in time. Atwater is generally considered to be the first Forest Service "Snow Ranger". He was a Harvard graduate and a consummate showman in the style of P.T. Barnum. While highly capable in avalanche mechanics and control, he was also quick to recognize opportunities for national leadership and public relations.

The California Olympic Commission hired a five man snow safety/ avalanche control team headed up by Dick Stillman (The Bear of Berthoud Pass) who was on loan from the Forest Service at Berthoud Pass in Colorado. Joining him were Peter Klaussen, Craig Rawlins, Dick Weiss, and Norm Wilson, all from the ski patrol at Squaw Valley. During the Games, in addition to Stillman's Team and separate from it, there were 76 people on the Squaw Valley Ski Patrol which had first been organized in 1959. Included in that 76 were 5 women, 12 doctors and 8 professional patrolmen. The rest were volunteers. A large patrol was needed in order to provide for public safety and almost police- like crowd control for the thousands of skiers and spectators that crowded the ski area during the Games. A principal objective was to keep as much of the ski area open to the public for skiing as possible even during the progress of the Games. For example, recreational skiing was available on Squaw Peak on February 19 right after the running of the Men's Downhill Race. And Little Papoose was kept open except on February 23 and 26 during the Ladies and Men's Giant Slalom Races,

It was decided that a team of 6 Forest Service "snow rangers" would be brought to Squaw Valley, under the leadership of Monty Atwater, to provide backup to Stillman's Snow Safety/ Avalanche Control Team, and as an exceptionally good training opportunity and also an outstanding public relations opportunity. This was a major expansion since in 1956 there was only one snow ranger - Nelson Stone - on the entire Tahoe National Forest. Technically, the Forest Service has no formal position of Snow Ranger but the title is so easily understandable that it is often used.

In addition to Atwater, others from the Forest Service were, Roy Feuchter from the Sequoia National Forest in California, Ross Files from the Mt Baker National Forest in Washington, Paul Hauck from the White River National Forest in Colorado, Bob Janes from the Plumas National Forest in California, Ed LaChapelle from the Wasatch National forest in Utah, and Paul Madden from the Tahoe National Forest in California. This created an unusual organizational structure for the Forest Service. To make it as manageable as possible, Atwater was assigned to Tahoe Forest Supervisor Hank Branagh as his winter sports representative in Squaw Valley. The other Forest Service personnel were temporarily moved to the Tahoe Forest as a training assignment. Two other Forest Service personnel were designated as alternates - Bob Safran from the Wasatch National Forest and Al Mullen from the Eldorado National Forest at the south end of Lake Tahoe. Competition was strong for these coveted positions and the need to stay in peak condition emphasized. One "Ranger" went so far as to construct some wheeled land ski so that he could use during the summer to stay in shape.

Completing the Forest Service Team was Phil Miller, a forester with a background in photography

from the Uncompahgre National Forest in Colorado. He was assigned the task of filming the activities of the Team. Movie cameras were large and bulky in those days - a far cry from modern video cameras. Miller's government camera was very large and used correspondingly large film reels. These together with tripods, weather protective gear, light panels and radio equipment amounted to a very large pack. Miller was not a large man but was an extremely strong skier and he often sank almost out of sight as he plowed through deep new snow. In order to have his scenes as "clean" as possible with untracked snow in the background, Miller would ski ahead of the Team and set up down the hill from where the Team would be skiing and working.

Miller's movie was last seen at the Governors Cup and Pioneers of Skiing Invitational in Telluride in 1987 where "Slim" Davis was honored as one of the Pioneers.

## **AVALANCHE CONCERNS**

The two teams of 12 men probably represented the largest and best trained group ever assembled for snow safety! avalanche control.

Surely it was imposing and confidence inspiring in the early morning hours to see the bright orange parkas of the Stillman Team and the pale forest- green parkas of the Atwater Team strike out to test and stabilize the ski terrain. Close and easily accessible slopes like KT -22 were usually opened by Protective Skiing. As more difficult slopes were attacked, the still morning hours would sometimes be shattered by the loud cracks of explosive hand charges or the deeper boom of Recoilless Cannon fire. The 12 men worked in teams with a minimum of two for Protective Skiing and hand charging, and three or more for artillery work and cornice blasting. Since Stillman was a protégé of Atwater's and because of their overlapping backgrounds they were able to share leadership responsibilities comfortably.

The two teams also had a resident Weather Bureau forecaster on site and their own system of observation stations including snow and temperature study plots at several locations which were manned daily. This information was critical for determining what safety precautions the Teams needed to take each day.

The threat of avalanche problems was not terribly great, however because of the propensity for heavy snow fall in the Sierra Nevada Mountains, there was always a possibility for crippling avalanches. In fact, historically, the Railroad over the Donner Summit near Squaw Valley had been plagued by avalanches for years until several costly snow sheds were build to cover the tracks where they crossed the avalanche chutes. They are still functional today.

In an effort to alert the public to the possibility of avalanche danger, during the Olympic Games the Forest Service published a small pamphlet entitled "Winter Avalanches and Snow Safety at Squaw Valley - Tahoe National Forest" As an introduction, it chronicled the following history.:

"In 1949, the ski lift to Squaw Peak went into operation and was promptly knocked out by an avalanche from the headwall above. In 1952, a winter of heavy snowfall, three lift towers were destroyed ..... and a lift operator was killed. In 1955, a skier entered the KT-22 gully during a storm, in spite of warnings, and was killed ..... In 1958, the top terminal of Squaw Lift was demolished and during that winter, there were 60 known avalanches of dangerous size which would affect the skiing areas of Squaw Valley."

Consequently, in 1958 a Snow Safety Plan was developed for Squaw Valley by the Technical Director of Ski Events, VIII Winter Olympic Games with the Forest Service acting as technical

advisors. The Defense Department, through Lt. Col. A. A. Hayman, Jr. at the 6th Army Headquarters at the Presidio in San Francisco cooperated in this effort by furnishing military artillery weapons, ammunition and training.

Early on it was recognized that the heavy cornice over- hanging the start of the Men's Downhill Racecourse could pose a threat if the area was hit by a heavy snow fall. It was checked daily but always found to be solid and, indeed, picturesque., and would require a large effort to remove it.

The Games started without any new snowfall. In fact it was turning out to be a very light snow year which did not bode well for some of the cross country races. Then just a day before the men's Downhill Race a heavy snow was predicted, and it was felt that the cornice had to be removed. The avalanche teams made the difficult climb to the top of the cornice and laid Bangalore torpedoes across the top of the cornice at about the point where the overhang began. The Bangalore torpedoes were long cylindrical tubes about 4 feet long and about 2 inches in diameter and filled with high explosives. They could be joined together by threads on each end and when so joined they could be ignited at one end and would carry the charge almost instantaneously through the entire line of torpedoes. It was a heavy enough charge that it could over- turn a piece of heavy equipment such as a tank.

The charge was detonated without mishap and the cornice was sliced off in an almost picture-perfect fashion to the tremendous cheers of the several thousand spectators that had gathered during the preparation of the event. Unfortunately, the large chunks of the cornice not only dropped as planned but then rolled on down the Men's Downhill Course coming to rest in the middle of the Course for a distance of several hundred feet. Some of these blocks of solid ice were as large as an automobile! The Men's Downhill Race was to start the next morning!

A Company of Navy Seabees from the Marine encampment at Pickle Meadows on the Toiyabe National Forest was stationed at the entrance to Squaw Valley to be available if manpower was needed for any unexpected emergency. The Cornice had provided just such an emergency! Some 100 Seabees worked through-out the night and by daybreak had the course cleared of cornice ice and also boot- packed into an outstanding racecourse. The Seabees also helped out by boot-packing the 12,000 car, on-snow parking lot in the Olympic Village after 10 inches of snow had fallen.

In the early days of avalanche control, it was more of a craft than science. However, as Forest Service studies continued at Alta and new research was conducted by the Forest Service Experiment Station at Fort Collins, Colorado, early methods and knowledge were refined and a larger body of skilled experts developed.

## **SNOW AVALANCHE FUNDAMENTALS**

Due primarily to temperature gradients within the snowpack and conditions under which the layers are formed, some layers of snow do not always adhere to the layers beneath them. Strong tensions may also develop within a snowpack. When this happens, the upper layers can release and slide down the hill, often as a homogeneous slab. Depending on the thickness of the upper layers, huge amounts of snow and hundreds of tons of material may be on the move. Avalanche control is basically recognizing and identifying these weaknesses and tensions that may exist in a snowpack, and then causing them to release safely under controlled conditions.

Either natural or man-made activities can act to trigger this release. Triggers might be an impact or jolt to the snowpack, a shaking or vibration or a shearing such as something cutting across the pack

as might happen from a skier or snow vehicle (this would be similar to a sharp blade cutting across a rubber band drawn tight or under tension). When done deliberately by skiing it is known as Protective Skiing. An impact or jolt to the snowpack might range from an earthquake or tremor, to the concussion or shock waves from an explosion or even sonic boom. Temperature change or overloading can also be triggers.

Avalanche training, then, involves learning to recognize the conditions that would cause a snowpack to be unstable. Factors such as wind, temperature, temperature changes, snow type such as depth hoar, graupel, spatial dendrites and ice crystals, and the rate that many of these conditions change can all be involved. Danger signals become things such as prolonged, heavy snowfall, sudden changes in temperature, wind, rate of snowfall, lack of settlement, and a variety of skiing conditions that can signal changes in the snowpack.

An axiom for the Snow Ranger is that 'The final determination of whether the snow will slide is made by trying to trigger it'. This has led to the widespread use of explosives in avalanche control.

For small, easily accessible slopes, Protective Skiing or explosive hand charges delivered by the ski-patrol are an economical method to attempt to trigger or stabilize avalanche slopes. Early on, the charges were simply a stick or two of dynamite but dynamite is dangerous to carry and work with because it can be very unstable, so military plastic explosives (C-3) are now used along with a blasting cap, fuse and pull-wire igniter. Since the burning time for the fuse material is quite accurate, the time between ignition and explosion can be judged by carefully cutting the length of the fuse. C-3 also eliminates the problem of the instability of the nitroglycerin in the dynamite and the very painful nitro headaches. The charges are made up in the ready room before going out on the slopes to insure carefully constructed charges that are safe and not given to misfires. Trying to work in the field under freezing and sometimes stormy conditions is very difficult.

However, larger and less accessible slopes are too dangerous to approach on the ground. Aerial bombing from helicopters is quite effective, but also quite costly. The biggest drawback however, is the inability to operate during storms which is usually the best time to attack the avalanche danger. Military artillery was found to be a relatively inexpensive way to reach the larger, less accessible slopes, and to deliver a significant shocking force to the snowpack. It could also be set up for blind firing during storms. Initially the 600 pound, 75 millimeter Pack Howitzer was tried. But primarily for ease of handling, the military Recoilless Rifle at 167 pounds was found to be a better tool for reaching problem slopes. The name came from the fact that the recoil from the cannon is replaced by a blast of gas to the rear. There is essentially no recoil, but a serious danger to anyone standing to the rear of the weapon.

Use of these weapons led to conflicts with the control of weapons that might be used for criminal or even terrorist activities. A major problem was encountered - the military requirement that all military weapons be used only by authorized government personnel. This, in turn, led to the requirement that military ordnance be handled only by government personnel on the ski areas. Since the Forest Service permits authorizing ski areas on national forest land required that the permittee provide for public safety, the use of military ordnance led to the Forest Service having to participate in part of the permittee's operation. The question, then, became where to draw the line on federal participation/subsidization of a private commercial operation.

In order to find a civilian replacement for military ordnance, the Forest Service developed the Avalauncher - a gas operated cannon that was constructed by modifying a baseball pitching machine originally developed by Frank Parsonneault. It functioned similar to a mortar with an explosive charge being propelled out the barrel by a gas propellant, and is technically within the



purview of the National Firearms Act of 1934 and the Gun Control Act of 1968. Although successful, the Avalauncher and later variations on the Avalauncher such as the Falcon GT, and Bermite Corporation's RAMP still do not have the range or accuracy of the military ordnance. Consequently, they have not completely solved the problem of use of military ordnance in avalanche control.

Although not the first, the Olympic Games at Squaw Valley became one of the early uses of the Recoilless Rifle in avalanche control. Participation by the Forest Service Snow Rangers was required for their use. Four 75mm cannons and one 105mm were assigned to the Squaw Valley complex. One gun on KT-22 covered the headwall and part of the men's downhill course. Another, on Papoose Peak covered the men's giant slalom and women's downhill. A third sat near tower 13 of the Squaw Peak Lift to cover the west face of KT-22 to keep it from avalanching across the finish of the men's downhill course. A fourth was kept in reserve. A final weapon was mounted on a truck so that it could be moved around the area as needed, including areas that might threaten some of the nordic events. All of the gun placements and powder caches were accessible by lift.

### **"FIRSTS" AT THE GAMES**

- Use of Recoilless Rifles. Such weapons had been used elsewhere on a few occasions but never as part of an Olympic Games.
- The construction of an entire Olympic Village where all of the competitors were housed together - and within a 5 minute walk of all of the events except the Nordic. Two centers included lounges, restaurants, bars, shops, first aid and restrooms, and an athlete recreation center.
- Artificially refrigerated speed skating oval where control of the ice surface temperature would prove to increase record breaking possibilities.
- A separate telephone system and prefix (OLympic 8-1960) for the Squaw Valley Complex.
- First nationally televised Olympic games.
- The introduction of an official Winter Sports Uniform for the Forest Service Snow Rangers. Black ski pants with the standard uniform shirt over a black turtleneck and a light green, nylon parka with an orange and black felt patch to replace the official bronze metal badge for visibility and safety in case of a fall.

Forest Service personnel were headquartered at the Truckee Ranger Station, but took their meals with the athletes in the Olympic Village. Usually two or more personnel stayed in the "Ready Room" at Squaw Valley Lodge in case of overnight emergency. Since avalanche hazard wasn't a problem all of the time, the avalanche Is now-safety teams helped out with course preparation, course policing, ski patrol and public information.

### **AFTER THE GAMES -**

The plan was to make a State Recreation Area at Squaw Valley utilizing the approximately 1,000 acres that the state would control and the land under permit from the Forest Service, and certain parcels of private land. The Board of Geographic Names changed the name from Squaw Valley to Olympic Valley, however the ski area kept the name Squaw Valley. It was a complicated infrastructure given the cast of people and structures, equipment and ownerships involved. The value of everything skyrocketed as a result of the Games. Many personalities had become accustomed to special privileges, authorities and control. The situation did not fit well with the

standard management structures of the various federal, state and county agencies involved. Over time, Alex Cushing became the State of California's concessionaire for operation of the facilities at the State Park. He was also the Forest Service Permittee for much of the ski terrain. Three additional formal agreements were executed between Cushing and the Olympic Commission and the State in an effort to clarify management responsibilities and fees and charges related thereto. Military requirements for use of the weapons used in avalanche control were a further complication. The situation was ripe for playing the many personalities and situations and regulations against each other.

No one was more adroit at this than Cushing. After several tumultuous years of continuous disagreements, penalties and overlapping lawsuits often related to environmental and safety concerns it became an untenable situation. When Cushing applied for an additional permit to expand into another area called the Sun Bowl it was decided that he would not be a satisfactory permittee based on the never ending controversies caused by his past performances between him and the Forest Service and the State of California. His application was refused and after lengthy, legal appeals this refusal was eventually upheld by the Secretary of Agriculture, Orville Freeman. The Department of Agriculture is the Cabinet level department that oversees the Forest Service. It was finally agreed that many of the overlapping authorities and responsibilities could be resolved by making a land exchange whereby all of the national forest land

involved would become state lands, and key private parcels would also pass to the state. With this action, a fine, true state park was created - probably unlike any other in the United States. Cushing died in 2006 at age 92

## **THE FUTURE**

In 2010, over 60 years after Alexander Cushing first imagined Squaw Valley as a major ski resort, KSL Capital Partners, a private-equity firm in Denver took over with the commitment to invest over \$50 million in capital improvements over the next three to five years. Their plan envisions making Squaw "one of the best, if not the best" resorts in the world as a part of their world-wide complex of resorts, golf and business clubs.

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