

Exhibit 4: Carpinteria Creek Watershed Fish Barriers

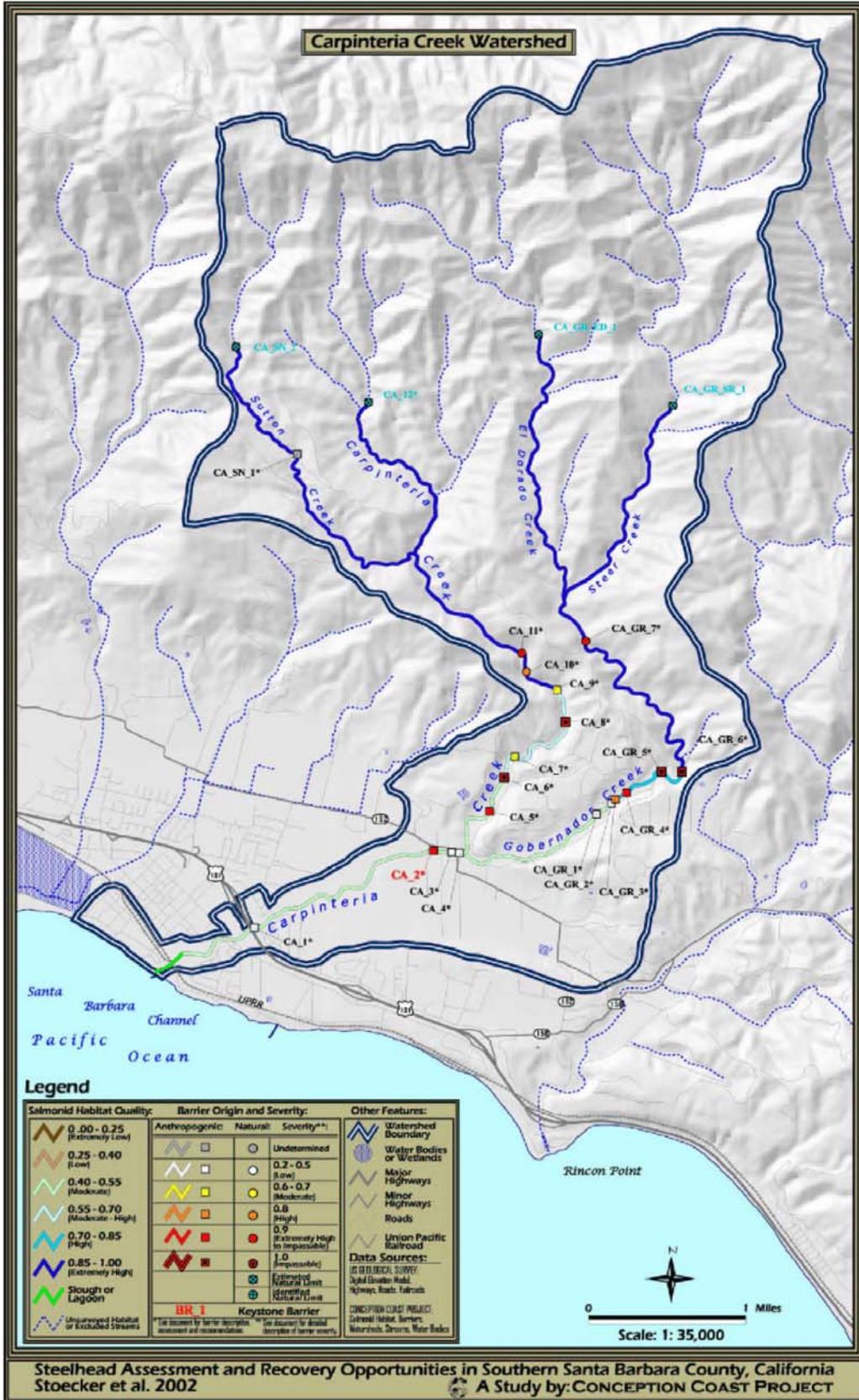


Exhibit 4: Carpinteria Creek Watershed Fish Barriers

Barrier ID: BR_CA_2

Stream: Carpinteria

Barrier Type: Private Stream Crossing

Location: Driveway at 6217 and 6199 Casitas Pass Road

Ownership/Interest: Bliss



Description: This crossing consists of a concrete road that spans the entire stream channel in a mild U-shape between the bank tops. The crossing is 28 feet wide with an overall length across the creek of approximately 100 feet, depending on where measurements are taken. The overall length of the crossing from bank to bank is difficult to determine because there has been significant modification of the banks to create the gradual U-shape crossing. Downstream of the crossing, large boulders have been placed to reduce scour and undercutting of the concrete crossing. These large boulders extend downstream from the crossing 20 feet producing an irregular and moderately steep cascade. Concrete and boulder riprap extends downstream from the crossing on both banks.

Condition: The structure is in poor condition with many breaks in the concrete, exposed metal bars, significant undercutting of the downstream side of the crossing, and moderate bank erosion.

Diagnosis: The overall height of the crossing, from the bottom of the downstream pool to the downstream lip of the crossing, measured 8 feet. During moderate flows, the 2-foot deep pool at the downstream end of the boulder cascade would provide sufficient depth to provide a steelhead with a moderately difficult jump approximately half way up the boulder cascade to a small, 1-foot deep resting pool 6 feet downstream from lip of the crossing. From this resting pool, a steelhead would need to jump vertically 4 feet and horizontally 6 feet in order to land on the top of the crossing. Executing this jump from the shallow resting area would likely be impossible due to the lack of pool necessary to gain enough jumping acceleration. The shallow, sheeting flows over the crossing during low flows and fast velocities encountered during high flows make this jump, landing, and migration across this crossing extremely difficult or impossible, depending on the configuration of the downstream boulder cascade and stream flows.

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Recommended Action: Due to the extremely high severity of this structure to upstream migration and location downstream of virtually all productive spawning and rearing habitat in the watershed, this structure must be removed or modified to ensure effective upstream passage of steelhead. The Carpinteria Creek Committee and Department of Fish and Game are currently working on addressing improved steelhead passage at this site. Removing this structure and replacing it with a bridge that does not impact the channel is recommended and would provide the most effective, long-term solution to the fish passage situation and possibly for the landowner. The relatively narrow stream channel provides an adequate situation for a bridge at, or near, this site. Because of the significant amount of sediment trapped behind this crossing and the change in streambed elevation downstream, additional studies are needed to determine what possible impacts would be associated with removing this structure. Carl Stucky, who is a contact with the owner of the crossing, reported that a bridge would need to be able to carry 40,000 pounds of weight and ideally a gate restricting access from the public at the Highway 192 entrance would accompany a new crossing.

Barrier ID: BR_CA_5

Stream: Carpinteria

Barrier Type: Private Stream Crossing

Location: Approximate elevation 180 feet; Upstream boundary of Cate School property.

Ownership/Interest: Cate School Corporation



Description: This concrete crossing spans 76 feet across the stream channel and into loose silt, sand, and cobble-dominated banks. A 2-foot diameter metal pipe extends from under the structure. The crossing has a shallow concave in order to concentrate stream flows across the center of the smooth concrete surface. The centerline of this concave has three distinct slope changes along the 33 feet from the downstream lip to the upstream lip. Starting from the downstream edge, the first 9 feet had the steepest slope measured at 15.7%. The next 15 feet had a slope measured at 6.1%. The most upstream 9 feet, where vehicles would cross the structure, has the mildest slope of 3.7%. The surface of the structure rises 2 feet 8 inches over 33 feet for an average slope of 8.1%. 100 feet downstream from the crossing, the slope of the natural streambed was measured at 2.6%. The concrete measured between 2 and 2.5 feet thick from the exposed footing to the surface lip on the downstream side of the crossing. Downstream scour has produced a 4-foot vertical drop from the downstream edge of the structure to the deepest part of the streambed where a jump pool for steelhead would form during migration flows.

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Condition: The concrete is in fairly good condition but the structure has been severely undercut and side cut by stream flows that have caused major downstream scour under the entire structure and on both stream banks. A large hole on the upstream side of the crossing has undercut the middle of the structure and washed away streambed material that the concrete crossing was original poured onto producing a 15-foot wide by 17-foot long void under the crossing that is over 2-feet deep. This crossing is on the verge of complete failure and presents a hazard both to vehicular passage over the crossing and to private property during flood flows.

Diagnosis: The undersized metal pipe under the crossing is non-functional with the intake buried under the sediment backed up behind the structure. No fish passage could occur through this pipe. At the time of the survey there was no visible route under the crossing. Assessment of watermarks, substrate scour, and the downstream tail-water control indicates that a pool of at least 2 feet deep will develop downstream of the crossing during migration flows. During these conditions, a moderately difficult jump of 2 feet would allow steelhead to jump onto the downstream portion of the crossing. The smooth concrete and slope of over 15% would have shallow, high velocity flows making upstream migration extremely difficult or impassable for adult steelhead. In addition, the flows passing under the crossing into the jump pool would interfere with hydraulic conditions needed for jumping onto the structure.

Recommended Action: Work with landowner to determine if this structure is necessary or if alternative crossings in the area could provide access across the stream. If the crossing is not necessary or access can be obtained elsewhere, it is recommended that the structure be removed and the banks stabilized and planted with a small buffer of native riparian vegetation. The extent of sediment trapped upstream of the structure will need to be assessed prior to removal. If access at this site is necessary, a bridge with no encroachment in the stream channel is recommended.