

Sproul Creek Watershed Assessment 2020					All surveys conducted between Sept 24 and October 9, 2020. *Note that water year 2020 was ~60% of average in the Sproul Creek watershed										
Stream Reach Name	Landowner	Sub-Reach	Dry Reach?	Flow and Water Quality Observations	Reach Length (ft)	Average Slope (%)	~Average Active Channel Width (ft)	Dominant Channel Substrate	Legacy Channel Disturbance	Recent Channel Disturbance/Restoration Activities	General Morphology	Fish and other species Observations	Aquatic Habitat Conditions	Restoration Potential	
Little Sproul Creek	Individuals, Wagner Ranch, Marshall Ranch		No	Good flow of cold, clear water. Flow was observed to be continuous throughout the survey extent with the exception of one 100' section approximately 800' upstream of the outlet.	10,775	2.2	15	Cobble in riffles, gravel in pools	riparian corridor was once logged. A metal machine tread was observed protruding from the streambank in the northern fork of the upper reach.	One cabled boulder weir observed. Presumably other structures were also installed as part of a restoration effort.	A broad channel largely confined by steep slopes. Occasional mudstone bedrock outcroppings can be observed along the banks or underlying the channel. Landslide activity along valley walls is prevalent, especially in the upper reaches. Does not appear to be unnaturally incised.	Steelhead parr observed in abundance throughout the surveyed reach	Channel complexity fair to good. A relatively high density of woody cover provided by frequent landslide activity recruiting small diameter trees to the channel. Woody debris is however only occasionally of sufficient size and channel contact to create geomorphological change. Channel grades are somewhat homogenous, and deep pools are somewhat rare. However, very good baseflow, and perhaps the presence of shallow bedrock, are providing sufficient habitat to support a robust steelhead population even during a dry year.	LWD, boulder weirs.	
Warden Creek	Green Diamond Resource Co, Wagner Ranch	Upper		Continuous flow throughout though often very shallow in riffles. Water quality seemed good.	3,820	4.2	8	Cobble, gravel in pools	riparian corridor historically logged	A small legacy dam exists towards the bottom of the upper reach, a concrete structure with a ~5' wide sluiceway. Under observed flow conditions, the sluice was perched ~2' above the downstream pool, about 4' above the channel bed. Some bank erosion downstream of the sluice and channel widening upstream of the dam. 1 railcar bridge ~500' downstream of the dam.	Similar to Little Sproul but steeper and narrower. generally confined, with some bedrock outcrops and frequent landslide features. Somewhat more complex with deeper pool development. Some reaches mildly incised, generally 2-3'. Several areas of active bank erosion were observed at outside bends, with scarps sometimes 6' tall or greater. Erosion more prevalent in the upper portions of the surveyed reach.	Steelhead parr seen throughout, though seemed to be of lower density than in Little Sproul. 1 Foothill yellow-legged frog (FYL) adult and 1 coastal giant salamander larvae also seen.	Very similar to Little Sproul though with a greater degree of woody debris and boulder recruitment through land sliding and bank failure. Additionally, wood appears to be incorporated into the channel bed more frequently, resulting in more frequent scour pool development.	LWD, boulder weirs. Potential to operate the existing dam as a flow enhancement feature. Just upstream of the dam, the valley is unconfined and a ~0.5 acre meadow along river right could support an off-channel pond.	
		Lower		Flow generally continuous with the exception of three short dry stretches, ~ 80', 360', and 200' respectively.	3,620	6.9	6	Cobble to boulder in steepest sections	riparian corridor historically logged	none obvious	Very steep and bouldery, with steep valley walls. One ~850' section has a slope of 18% and is dominated by large boulders. Occasional bedrock outcroppings. Less landslide input than in the upper reach.	Steelhead parr seen throughout	Fair complexity, some incorporated LWD but more often driven by natural boulder weirs.	LWD	
Sproul Creek Mainstem	Individuals, Wagner Ranch, Green Diamond Resource Co		No	Channel generally continuously wetted with occasional dry reaches, the longest being 500' in length. Pools largely stagnant, infrequent observations of significant surface flow. Pool connectivity moderate, wetted riffles between pools frequently too shallow to be navigable by fish. Water quality moderate: while some pools were clear, many were highly tannic and to a lesser extent, contained dense growth of iron oxidizing bacteria or green algae.	19,000	0.95	25-35	Cobble and Gravel	riparian corridor historically logged, 2 old ford crossings, 1 of which left small bank scarp.	at least 3 boulder weirs with 2 log structures above the lowest	Broad and low angle, valley a mix of unconfined and confined. Confined reaches mostly confined along just one bank. Occasionally split channel. Periodic bedrock outcroppings along the banks and bed. Many landslides observed on valley walls of outside bends. Channel complexity and pool development largely driven by bedrock outcrops and attendant boulder recruitment. Many reaches are of homogenous grade.	Salmonid Parr seen throughout, though seemingly of lower abundance than in Little Sproul. Pikeminnow YOY and adults appear to be more populous in many pools than salmonids, especially in the lower extent of the reach. Two FYLFs seen in pools. One great blue heron, one mink, otter scat.	Low Density of large wood and woody cover. Medium density canopy provided primarily by alder. Pools generally shallow except where bedrock influenced. Bedrock pools appear more likely to have green algae growth, probably the result of reduced canopy in those areas. Pikeminnow intrusion likely pressuring salmonid populations. Apparent stagnation of many pools raises questions about mid summer water quality/temperatures. Installed boulder weirs have effectively created scour pools below.	LWD and boulder weir installation to increase deep pool habitat. Possible small flow enhancement reservoir opportunities in adjacent meadow areas, though all within the floodplain.	

South Fork Sproul Creek	Green Diamond Resource Co		No	Dry at West Fork confluence, long dry stretches with intermittent pools for first ~4,000'. Many though not all of these lower pools were observed to be shallow, stagnant, tannic, and supporting algal growth. Surface flow quantity and water quality gradually increasing upstream. Flow mostly continuous with clear pools at the upstream survey extent	12,210	1.2	20-25	cobble, gravel in pools	riparian corridor historically logged	appears to have been some large wood placement, at least one boulder weir at Cox Creek confluence	Similar to mainstem Sproul though somewhat narrower. Mostly in a confined valley with the exception of the reach between South Fork Trib 1 and Cox Creek. Occasional split channel, mostly in lower reach. Some landslide activity along outside bends. As with the mainstem, complexity and pools mostly driven by bedrock.	Salmonid Parr seen throughout in density comparable to the mainstem or somewhat higher. Likely observation of pikeminnow in lower reach. Lamprey ammocoete observed desiccating on edge of shrinking pool in lower reach.	Lower reaches comparable to mainstem, greater presence of bedrock in the upper reaches allows for better pool development and complexity. Still a relatively low density of large wood, with many long runs of homogenous grade and substrate. Water quality and flow were both good in the upper reaches, which may be a valuable rearing area.	LWD and boulder weir installation to increase deep pool habitat. Possible small flow enhancement reservoir opportunities near Trib 1 and Cox Creek confluences.
South Fork Trib 1	Green Diamond Resource Co		No	Continuous flow of clear water except for small dry patches where aggraded (i.e. upstream of a log jam)	6,135	4.3	10	Boulder and cobble, gravel in pools	riparian corridor historically logged	Several cut logs observed in the channel, likely left from legacy logging.	Coarse and steep channel in a confined valley. As with other reaches, occasional bedrock outcroppings. Substantial recruitment of boulders and large wood from steep riparian hillslopes has developed a very complex channel. Forks at upstream end of surveyed reach narrow significantly and east fork is incised 2-3' with oversteepened banks.	~6 salmonids observed, one of which was ~6" long. Others much smaller.	Likely the highest density of large wood and boulders of all the surveyed reaches. Highly complex with good pool development and dense woody cover. Water quality seemed high. Salmonid abundance seemed relatively low, perhaps due to steep channel gradient.	No recommendations at this time
Cox Creek	Green Diamond Resource Co	Upper	No	Continuous flow of clear water, ~5gpm estimated at upper end at bedrock chute.	1,300	5.4	4-6	Cobble and Gravel	riparian corridor historically logged, old road bed adjacent to channel above crossing.	Existing CMP crossing, legacy roadbed eroding into channel along upper north fork	Small channel in a mostly confined valley. One landslide into the channel. Some areas appear 1-2' incised. Several bedrock outcrops.	No fish observed. Two rough-skinned newts.	Moderate woody cover but not much large wood in the channel. Pools frequently shallow but good flows allow for high water quality.	LWD, though no fish observed. Culvert may be velocity barrier.
	Green Diamond Resource Co	Middle	No	Continuous flow of clear water above, then becoming intermittent with increasingly poor water quality before going primarily dry for the lower 3,000'.	6,310	3.9	8	Boulder and cobble, gravel in pools	riparian corridor historically logged	None observed	Steep and coarse, confined valley, moderate landslide activity.	Salmonid parr observed in lower wetted reach where pools were intermittent. Many pools with fish were drying out and of poor quality, several with dense growth of iron bacteria.	Moderate amounts of complexity, large wood, boulders and woody cover. Pools generally shallow. In the upper reach, greater surface flow keeps these pools in good condition, but less surface flow in the lower reach made for shrinking pools of sometimes poor quality. Long runs with little pool development appears to further limit habitat.	LWD, boulder weirs. Encouraging deep pool development, especially in the lower reach, appears to be critical to achieve viable habitat in dry years.
La Doo Creek	Green Diamond Resource Co, Wagner Ranch		No	A mix of continuous and intermittent flows, water generally clear.	8,900	4.0	8	Cobble with gravel in pools. Some boulders in the upper reaches.	riparian corridor historically logged, one legacy ford crossing in good shape	Culvert crossing along active road. Outlet perched ~2'	Relatively steep and course channel, confined valley, occasional bedrock exposures and landslide activity. 14-18' waterfall just above Sproul confluence.	Waterfall is a barrier, no fish observed.	Fair complexity and pool development in some reaches though the waterfall is a permanent barrier. No amphibians observed but likely provides habitat for some species. May contribute invertebrate drift to Sproul.	Some potential for instream reservoirs given lack of fish, however steep grades and valley confinement would limit storage capacities.

Lower West Fork Sproul Creek	Green Diamond Resource Co		No	Continuous flow, generally good water quality. Some pools dark with tannins	19,940	1.1	20	Cobble and Gravel	riparian corridor historically logged. 1 legacy ford crossing in good shape.	What appears to be an older wooden footbridge has fallen into the channel and created an effective weir and scour pool.	Very similar to the main-stem Sproul reach though somewhat narrower and slightly steeper: Broad and low angle, valley a mix of unconfined and confined. Occasionally split channel. Periodic bedrock outcroppings along the banks and bed. Many landslides observed on valley walls of outside bends. Channel complexity and pool development largely driven by bedrock outcrops and attendant boulder recruitment. Many reaches are of homogenous grade.	Salmonid parr seen throughout	More large wood, in addition to significantly increased surface flows, results in improved pool density and depth over the lower reach of mainstem Sproul. Areas of bedrock influence continue to produce the deepest pools. As with the mainstem, long runs of homogenous grade and substrate are common. Overall, habitat seems abundant, if not somewhat lacking in cover and complexity.	Boulder weirs and LWD to encourage pool development
Upper West Fork Sproul Creek	Green Diamond Resource Co		No	Mostly continuous flow of clear water. Flow trends towards intermittent in the uppermost reaches and many pools were dark with tannins or densely colonized by iron bacteria.	8,290	2.3	10-15	Cobble and Gravel	riparian corridor historically logged. Many cut logs in the channel, presumably debris from legacy logging	none observed, Existing bridge near downstream end. Crossing of eastern fork at upstream survey end appears to have recently been decommissioned. When observed, the crossing and an adjacent, tributary, road section were largely unarmored and covered with a thick layer of fine sediment	Steeper and more complex than the lower West Fork, in a predominately confined valley. Pool formation driven as much by large wood as bedrock. Periodic landslide activity as with other reaches.	Salmonid parr seen through much of the reach except for uppermost regions	A relatively high density of large wood drives frequent pool formation and thick riparian vegetation provides good cover. One of the more complex reaches. Much of the wood appears to be debris from legacy logging operations. Generally good quality habitat with good base flows in the lower and middle stretches, though lack of surface flow in the uppermost reaches led to a significant decrease in habitat.	LWD, though required infrequently, notably in the vicinity of the bridge. Armoring of decommissioned crossing on upstream end.
West Fork Trib 1	Green Diamond Resource Co		No	Flow rarely continuous, often intermittent or dry. Pools stagnant and generally of poor water quality in the uppermost reaches, better close to the downstream end.	10,180	5.1	10	Cobble and Gravel	riparian corridor historically logged. Many cut logs in the channel, presumably debris from legacy logging	None observed. One legacy wooden bridge.	Essentially the same as the upper West Fork though steeper and somewhat coarser substrate.	salmonid parr seen through much of the reach, though often in dwindling pools of low water quality.	As in the upper West Fork, a high density of large wood and riparian vegetation allows for good habitat. However, surface flows are significantly reduced relative to the West Fork and habitat, at least as observed in this dry year, was limited. Several pools with salmonids were on the verge of drying out and of very poor water quality.	LWD, though required infrequently. Habitat largely limited by flows.
West Fork Trib 2	Green Diamond Resource Co		No	Largely continuous flow of clear water. Fine sediment noted in some pools.	2,020	3.7	8	Cobble, gravel in pools, boulder in riffles.	riparian corridor historically logged. Some cut logs in the channel, presumably debris from legacy logging	None Observed	Steep and coarse channel in a confined valley. Bedrock outcroppings and landslide activity common. Substantial complexity driven by high density of large wood.	salmonid parr seen throughout	High density of LWD and boulders make for frequent pool development. Moderate baseflows providing quality habitat when observed.	No recommendations at this time