Suscol Creek Collaborative Partnership

Restoration Project

Prepared by Charley Dewberry
for Napa Wine Estates LLC
January 2005

Suscol Creek Collaborative Partnership

Restoration Project

Sponsor: Friends of Napa River

Project Manager: Chris Malan

Contract Services: Josh Malan

January 2005

INTRODUCTION

This plan is designed to provide a conceptual framework and recommendations for maintaining and restoring reaches of Suscol Creek. Focus is on steelhead trout (Oncorhychus mykiss).

Stream restoration and management is a long-term process that must addresses the sources of problems. Streams are intimately linked to their watersheds so it is primarily changes in the watershed that are the root cause of changes in streams. Decisions made by landowners on the lands within the drainage basin determine the health of Suscol Creek. Therefore, incremental annual changes that result in decade and century long trajectories in the landscape are the source of changes that are the focus of this study.

However, no plan for a portion of a basin can guarantee that steelhead will increase or even continue to exist in Suscol Creek or in the Napa Basin. Decisions made by upstream landowners can negate positive actions undertaken. Suscol Creek is also not large enough to sustain a run on its own. In addition, steelhead spend part of their life-cycle in the ocean; therefore, factors outside of Suscol Creek can significantly determine the steelhead's fate.

However, if efforts like this are not undertaken, steelhead are doomed in Suscol Creek and probably the Napa basin as well. If survival is low in the freshwater stage of its life cycle, there will be few returning adults regardless of ocean conditions or harvest. Restoration is rooted in projects like this.

OVERVIEW OF RESTORATION

Steelhead trout currently reside in Suscol Creek. Whatever has occurred in the recent and distant past has created the current conditions. The current conditions provide at least the minimum requirements for the steelhead's continued existence in Suscol Creek. The objective of this restoration plan is to first ensure that the trajectory of the health of the stream is not down. The first goal is to protect steelhead's continued existence in Suscol Creek. The second goal is to improve the health of the stream system and, as a result, increase the quality of the habitat for steelhead.

Small headwater streams like Suscol Creek are intimately connected to the landscape. Movement of water, sediment, and organic matter create and maintain the aquatic habitat. Surface flow originates as over land flow during storms and it rapidly ceases after storms. Low-flow is maintained by subsurface water movement within the basin. Subsurface water originates as water moves down-slope through the soil layer, shallow aquifer, or deep aquifer. The proportion of water that enters the stream from these three sources varies according to the geology, long-term climate patterns, short-term weather patterns, vegetation patterns, and the amount of water extracted from these subsurface water sources.

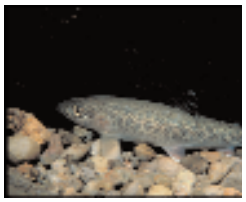
Sediment and organic matter (the food sources that drive the stream system) move into streams from surface erosion, mass erosion or stream channel cutting. Surface erosion occurs during storms when precipitation rates are greater than infiltration rates and results in surface flow. If this surface flow occurs on soil without cover it can cause significant erosion. Mass erosion occurs when heavy rains cause steep slopes to fail sending the material downslope into streams. Excessive stream channel cutting results when heavy rain fall on soils, slopes, and valley floors without adequate cover.

The valley floor and riparian vegetation has a profound effect on the aquatic system. Large trees limit light that keeps stream temperatures cool and limits algal production during the summer. Leaf litter also forms much of the organic matter that runs the stream systems during the winter and spring. Large live trees can stabilize stream banks and large down wood forms jams which are important elements that form stream habitat.

STEELHEAD LIFE HISTORY

Steelhead usually enter small streams during major storms and proceed high in the basin to spawn. Ideally, steelhead will move upstream on the largest flows of the year. About half of the adult fish die upon spawning. The rest return to the ocean to spawn once more in a year or two. The juvenile steelhead hatch in the spring and stay in fresh water for two years. The juveniles become smolts and migrate to the ocean during the spring of their second year. Steelhead stay in the ocean from one to three years before returning for their first spawning.

Since steelhead reside in freshwater for two years, conditions in streams are critically important for the life cycle. If few steelhead go the ocean the runs will never be large. High habitat quality in the freshwater portion of the life-cycle can buffer poor ocean conditions and low survival in the ocean.



CURRENT STATUS OF STEELHEAD IN SUSCOL CREEK

On June 22 2004, Charley Dewberry conducted a snorkel survey on Mark Couchman's property (Silverado Premium Properties). The survey ran from the man-made structure above Highway 29 to the top line fence. This corresponds to reach five of Alice Rich's study from 2002.

We divided the stream into pools, riffles, and glides. We snorkeled all pools where visibility was good enough to accurately sample the pools. The glides and riffles had little water and no steelhead were observed in them during the survey.

Of the 49 pools found in the reach, we snorkeled 46 of them (see Table 1). We observed a total of 119 age-0 trout and 26 age-1+ trout. Our uncalibrated population estimate for the reach was 127- age 0 trout and 27 age 1+ trout. In streams like Suscol Creek we usually see about 50% of the age 0 trout and 67% of the age 1+ trout. This corresponds to a calibrated estimate of 254 age 0 trout and 40 age 1+ trout. This indicates that trout are surviving year around in Suscol Creek. All observed trout were assumed to be steelhead as they have access to Napa River during the spring migration period. We observed no large fish that appeared to be a resident throughout its life.

The densities of age-0 trout in Suscol Creek are about average for small tributary steams in the Napa basin that contain steelhead. The presence of a large number of age-1+ steelhead in Suscol Creek is somewhat surprising given

Table 1. Suscol Creek snorkel survey by C. Dewberry (June 22, 2004).

Unit	length (m)	width (m)	Area	Trout 0	Trout 1+	centrarchids
G1	1	1				
R1	13	1				
P1	1	1				
R2	14	1				
P2	9	3		38	3	
R3	14	1				
P3	21	3.5		0		
R4	3	1				
G2	5	2				
P4	3	4		0		
R5	5	1				
P5	2	1		0		
R6	3	1				
P6	3	1		0		
R7	3	1				
P7	6	3		0		
P8	12	10				
P9	2	2		0		
R8	24	1				
G3	2.5	1				
P10	15	3		0		
G4	6	2				
P11	25	3		0		
DRY	160					
P12	12	2.5			1	
R9	11	2				
P13	6	2		0		
P14	1.5	1		2		
P15	9	2.5				1
DRY	75					
P16	7	3.5		0		
R10	19	1				
P17	9	2		0		
R11	15	1				
G4	2.5	1.5		0		
R12	4	1		0		
P18	7	2			3	5
R13	4	1				
P19	8	2		3	2	2

Unit	length (m)	width (m)	Area	Trout 0	Trout 1+	centrarchids
R14	39	1				
P20	12	2		4		
R15	18	1				
P21	13	2				
R16	21	1				
G5	5	3				
R17	8	1				
P22	4	3		0		
R18	21	1				
P23	5	3				
R19	18	1				
P24	5	3		4		
R20	18	1				
P25	4	2		2		
R21	4	1				
P26	7	2		8	2	
P27	4	1		1		
R22	15	1				
P28	12	2.5		3	2	4
R23	2	1				
P29	3	1		0		
R24	11	1				
P30	11	3		6	2	2
R25	5	1				
P31	12	3				
R26	30	1				
P32	26	2.5				
R27	18	1				
P33	11	2.5			1	22
R28	12	1				
G6	6	1				
R29	14	1				
P34	12	3.5		0		
R30	15	1				
P35	13	2		4	2	14
R31	18	1				
P36	11	3		2	1	27
R32	7	1				
P37	4	1		1		

Unit	length (m)	width (m)	Area	Trout 0	Trout 1+	centrarchids
R32	9	1				
P38	6	2		2		
R33	13	1				
P39	3	1		0		
R34	14	1				
P40	31	2		9	4	31
R35	21	7				
P41	11	1.5		0		
R36	19	1		0		
P42	5	1		2		
DRY	60					
P43	10	2.5		0		
R39	18	1				
P44	18	2		21	3	
DRY	38					
G7	15	1		0		
P45	13	2		4		
P46	18	2		0		
DRY	41					
P47	8	2		2		
P48	6	1		0		
P49	7	3		1		
				119	26	108

its small size in the reach. This indicates that steelhead are surviving better than average (for Napa basin as a whole) in this reach of Suscol Creek.

Is this population estimate more or less than was observed by Alice Rich in 2002?

Our calibrated estimate completed on June 22,2004 was 254 age 0 trout and 40 age 1+ trout. Alice Rich did not report a population estimate from her samples but one can be computed for the reach from her data. She sampled 12 pools within the reach. If we assume that the number of pools was the same (49) then her uncalibrated estimate for electrofishing was 139 age 0 trout and 24 age 1+ trout. These estimates correspond quite closely to the uncalibrated estimates from our dive survey. Her electro fishing estimates were not calibrated by any other method.

She surveyed the stream in September of 2002. One would expect that there would be considerable mortality of age 0 trout during the summer so a decline from 254 age 0 trout in late June to 139 age 0 trout in September would not be unusual. A decline of 40 age 1+ to 24 age 1+ is significantly fewer fish. However, since Alice Rich only sampled 12 of the 49 pools in the reach and the number of age 1+ fish varied greatly from pool to pool, her population estimate might be low. Therefore, at this point there is little reason to suspect that the numbers of trout were significantly different in 2002 and 2004.

During our survey, 108 bluegill (centrarchids) were observed in 9 pools from just below the bridge in the middle of the property to near the top of the pond. It is clear that last winter, the bluegill were swept out of the pond via the overflow channel. These fish represent a significant threat to trout in the

SUMMARY

reach. First, this is a significant number of fish compared to the trout. The bluegill are also large enough to eat small age zero trout. Just as significant, they compete directly for food with the trout. It is unlikely that bluegill can survive through the winter in the reach. However, there is a risk that more of them will enter the creek during this winter.

In the previous year, Alice Rich electrofished 12 pools in the reach and did not report seeing a single bluegill. Therefore, it appears that in recent years they are not swept out of the pond every year.

The steelhead population in Suscol Creek is above average for a stream of this size on the east side of the Napa basin. In particular, there is a higher number of 1+ fish than expected. The 2004 population estimates do not appear to be significantly different from the one collected by Alice Rich in 2002. The higher than average steelhead population reflects the high level of commitment of the landowners to maintaining healthy conditions in their portion of the watershed. The steep slopes are vegetated to minimize surface erosion and an ample riparian zone containing a mature Oak community is maintained.

MANAGEMENT CONCERNS

There are several concerns that should be addressed in order to insure the continued existence of steelhead in both the short-term and the long-term in the basin:

* The most important long-term threat to steelhead in Suscol Creek is the possibility of losing ground water inputs to maintain stream flow through the summer and fall.

* The most important immediate threat to steelhead in Suscol Creek is the introduction of bluegill from the pond into the creek.

* Continue to maintain adequate cover crops on slopes, especially those that are undergoing conversion to vineyards.

* Continue riparian management that emphasizes the native oaks and associated vegetation.

RECOMMENDATIONS:

*Monitor and evaluate the ground-water use on the property and try to minimize the risk of decreasing ground-water input to the stream, especially during the late summer and fall period. Water was observed being pumped into the pond on Sept 16th. Water being pumped into the pond in late summer lowers the groundwater table and potentially diminishes stream flow at a very critical time for steelhead. The upper portions of the creek above the pond were essentially dry to the property boundary. At this time we do not know if the groundwater pumping impacted stream flow in that reach. The installation of the two stage height recorders will help determine the impact of groundwater pumping on the property. The lower one will be used to construct a water budget for the watershed and the upper one will be used to carefully track the low-flows during the summer and fall. Also, the additional water pumped into the pond in the fall increases the risk that the pond will overflow during the winter. To minimize the risk of the pond overflowing during the winter, the pond should be lowered as low as possible by the late fall (see next recommendation). To aid in monitoring the groundwater conditions, maintain the lower stage height recorder to calculate a water budget. In addition, maintain the upper one during the low-flow period to trace the trends in groundwater inputs into the stream.

*Manage water levels in the pond to minimize the likelihood that over-flow will occur during the winter. Draw down the pond in the fall to minimum levels. If the pond does not fill to desired levels during the winter, pump water during late winter.

*Construct a large metal mesh cage to fit over the out-flow to keep bluegill from being swept out of the pond. A cage approximately 3-4 feet on each side would be large enough to require minimal maintenance during the winter.

*Continue to diligently maintain cover crops and minimize compaction on the property especially on steep slopes.

*Continue the riparian management including blackberry removal. In addition maintain the photo points and temnperature monitoring to help evalu-ate the success of the riparian management.

Conclusions

Suscol Creek has a higher than average number of steelhead. This is especially true for a small tributary stream on the east side of the Napa basin. This reflects the high level of commitment that the landowners have placed on management of their property. The most important long-term threat to steelhead in Suscol Creek is the possibility of losing ground water inputs to maintain stream flow through the summer and fall. The most important immediate threat to steelhead in Suscol Creek is the introduction of bluegill from the pond into the creek. The removal of blackberries and their replacement with riparian vegetation should be continued. The photopoints and stream temperature monitoring over time will document the change in riparian vegetation and their major effect on the stream system. The last potential concern is sediment moving from the hill slopes during major storms. Continue to diligently maintain cover crops and minimize compaction, especially on slopes.