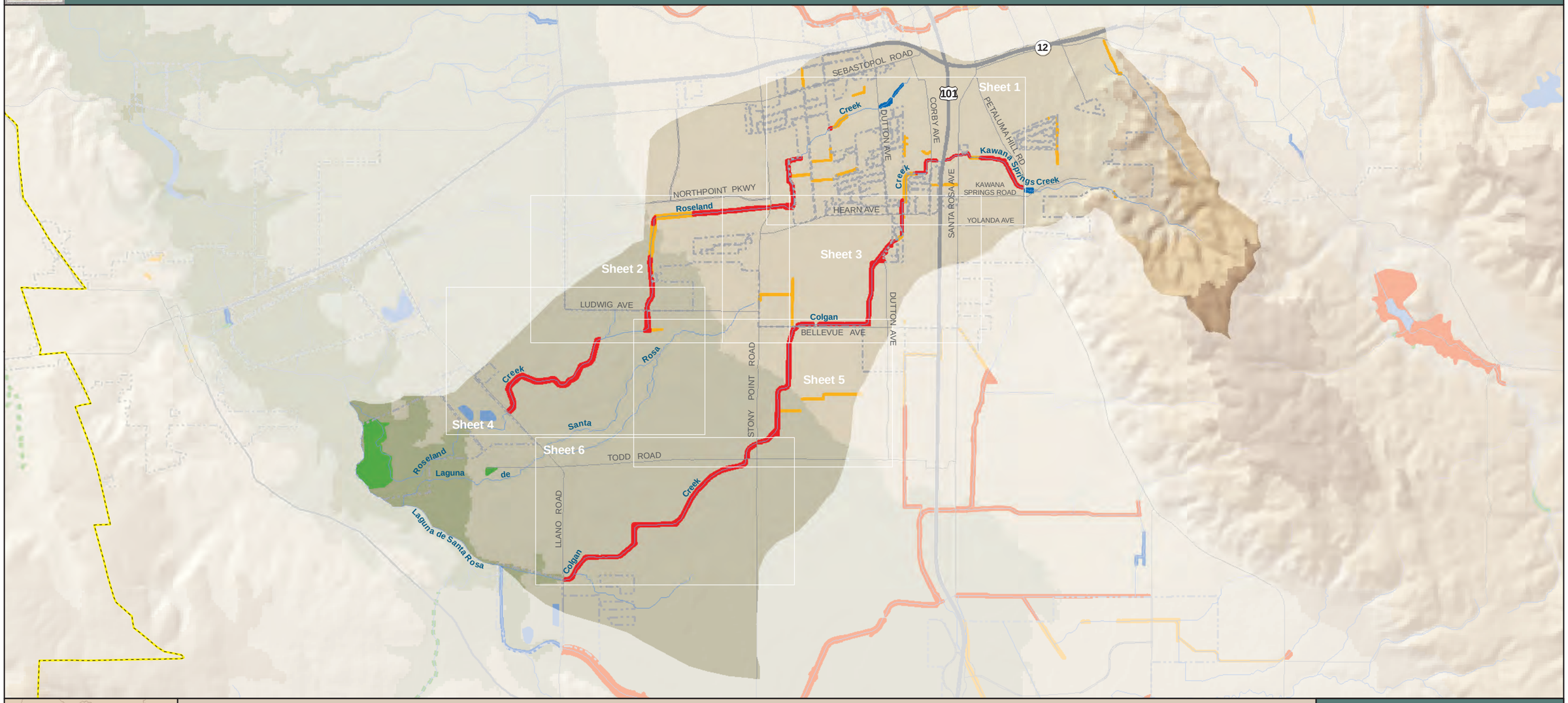
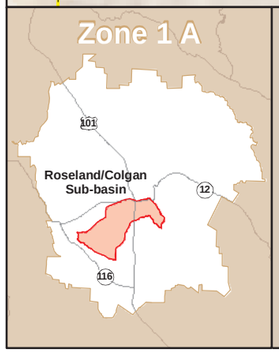
Sonoma County Water Agency

Stream Maintenance Program





SCWA Easements

- Owned In Fee-Engineered Channel
- Easement Engineered Channel
- Easement Modified Channel
- Easement Natural Channel

Elevation, ft.

- Below Sea level
- 0 - 25
- 25 - 50
- 50 - 75
- 75 - 100
- 100 - 250
- 250 - 500
- 500 - 1,000
- 1,000 - 1,500
- 1,500 - 2,000
- 2,000 - 2,500
- Above 2,500

SCWA Flood Control Zone Boundary | Water Bodies | Streams | City Limits | Reach Maps Index

Sources:
Sonoma County Water Agency
County of Sonoma
California Spatial Information Library

Figure 4-23

Roseland / Colgan Subbasin

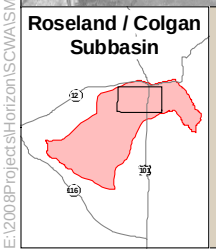
0 0.4 0.8 1.2 1.6
Miles

1:48,000

Horizon WATER and ENVIRONMENT

Sonoma County Water Agency

Stream Maintenance Program



Vegetation Type

- Blackberry Scrub
- Mixed Riparian Scrub
- Riparian Woodland (full canopy)
- Riparian Woodland (up to 75% canopy)
- Riparian Woodland (up to 25% canopy)
- Riparian Forest
- Ruderal
- Willow Scrub
- Developed

SMP Maintenance Reaches

Sources:
Sonoma County Water Agency
County of Sonoma
SCWA Imagery 2006
Geografika Consulting

FIGURE 4-24

Reaches and Vegetation

Roseland / Colgan (1 of 6)

0 500 1,000 1,500 2,000

Feet

1 inch equals 1,000 feet

Horizon WATER and ENVIRONMENT

E:\2008Projects\Horizon\SCWA\SMP\GIS\Layouts\Ch4ReachVeg_RoselandColgan.mxd MG 12-06-08

Roseland Creek – Reaches 6 & 5

JURISDICTION: Owned by City of Santa Rosa, SCWA maintenance easement

LOCATION: Reach 6 – west of Hwy 101, downstream of RR to 200ft upstream of Dutton Ave.

Reach 5 – Stroven Lane to ~100ft downstream of McMinn Ave.

Note: Reach 6 and 5 are disconnected by ~ 900 ft of channel outside of SCWA maintenance responsibility

ADJACENT LAND USE: Residential

UPSTREAM: Runoff from adjacent development

LENGTH: Roseland 6: 1,191 ft.

Roseland 5: 951 ft.

CHANNEL EASEMENT CORRIDOR WIDTH:

Roseland 6: 67 ft.

Roseland 5: 92 ft.

AVERAGE TOP-OF-BANK WIDTH: Roseland 6: no data

Roseland 5: 67 ft.

(b) Reach 6, looking downstream below Goodman Ave. Channel void emergent vegetation, good canopy development. Channel bed is a mix of mud and decaying leaves, present for a number of weeks or months. Surface flow is minimal with very shallow conditions 1-4" deep. (3/5/08)

MAINTENANCE HISTORY

(a) Reach 6, looking upstream near Goodman Ave. Note in-channel pool in background, emergent vegetation in foreground, perched stormwater culvert to left, gently sloping banks, and line of woody trees providing 50%-75% canopy closure. (3/5/08)

PHYSICAL CONDITIONS

Reach setting: Reach 6 is uppermost reach of Roseland Cr, which apparently drains commercial and residential development upstream but with no clear link to larger headwaters on Taylor Mtn.; aerial photos suggest that the footprint of Roseland Cr may be a relic drainage of Santa Rosa Cr; Based on winter flow, possible that these reaches go dry in summer.

Active channel: shallow and broad flows (photos a/b); width ranges from 4-8 ft in Reach 6, and 6-12 ft in Reach 5, with 1"-4" water depths (3/5/08).

Bed sediments/texture: dominated by organic matter (leaf litter) and muds;

Bank structure: earthen and gently sloped (< 3:1) in Reach 6 (photos a and b) and earthen banks with 2:1 slopes in Reach 5 (photos c and d).

Channel processes: Both reaches appear to receive most flow from local stormwater runoff; neither reach appears to experience very high flows as the beds are covered in a thick layer of decaying organic matter that had not been mobilized during recent storm events.

Water quality (qualitative): Clear and flowing in March 2008.

BIOLOGICAL CONDITIONS

Instream habitat: These reaches support limited instream habitat with an instream pond (photo a) occurring in upper Reach 6 and significant carbon inputs through decaying leaf litter in both reaches. Both reaches had only shallow water in the winter during observations (3/5/2008) with limited instream complexity for fish or amphibians. Based on winter observations, it is likely that both reaches dry down in the summer providing little to no over summer instream habitat.

Vegetation composition: riparian canopy is composed of mature oaks and a variety of ornamental trees along both reaches with a denser woody corridor in Reach 6; understory in Reach 6 is dominated by periwinkle, ivy, and sweet onion while most of the understory in Reach 5 is landscaped turf grass.

Riparian corridor and canopy closure: 5-15 ft. wide corridor on each bank; canopy closure between 50%-75% in reach 6 and reduces down to ~25% in Reach 5.

Listed species with potential to occur: None.

(c) Reach 5, looking upstream from crossing at apartment complex. Note linear trapezoidal channel, line of woody riparian trees along the toe of the slope, and the grassy lawns above the bank. Homes on both sides relatively close to creek (3/5/08).

(d) Reach 5, looking downstream toward McMinn Ave. from below apartment complex. Channel x-section has narrowed, more emergent vegetation, and the banks are heavily vegetated with a woody thicket of shrubs (3/5/08).

MANAGEMENT CONSIDERATIONS AND OPPORTUNITIES

Management considerations for both reaches are limited. Observations during March 2008 did not indicate any immediate maintenance actions are required related to flood conveyance and/or bank stability in either reach. Reach 6 appears to convey very little water and Reach 5 is highly landscaped, flows through an apartment complex, and does not appear to have any maintenance issues at this time. Due to the high level of bird usage in Reach 6, additional riparian planting and canopy development in Reach 5 could benefit these existing nearby populations.

Roseland Creek – Reach 4

JURISDICTION: Owned in-fee by SCWA

LOCATION: West of Burbank Ave. to Stony Point Rd.

ADJACENT LAND USE: Residential on west and agriculture/grassland to east, south

UPSTREAM: ~1500 ft of non-SCWA maintained channel through oak savannah

LENGTH: 3,304 ft

CHANNEL EASEMENT CORRIDOR WIDTH: 126 ft

AVERAGE TOP-OF-BANK WIDTH: 75 ft

(b) Mid Reach 4, note - large natural buffer to the east (background), lack of woody riparian canopy at immediate channel, and somewhat incised active channel marked by dense emergent vegetation (March 2008).

MAINTENANCE HISTORY

(a) Upper Reach 4, looking downstream from Comalli St. Channel is not constrained by development and still maintains a wide (75-100 ft) buffer between the channel and new developments to the west. Channel is heavily vegetated with small willows, thistle, teasel, etc and almost no riparian canopy (March 2008).

PHYSICAL CONDITIONS

Reach setting: Area has mix of recent urban development to the west and undeveloped grassland/savannah and agriculture to the east and south; reach is separated from Reach 5 by ~1500 ft of non-SCWA maintained channel. Reach is very low gradient, straightened, and flows through the Santa Rosa Plain.

Active channel: 6-10 ft. wide; 2-6 ft below high banks, flow 2"-6" deep, mostly flowing through cattails and other emergent vegetation.

Bed sediments/texture: dominated by a mix of mud and organic matter (leaf litter, decomposing cattails, etc).

Bank structure: all earthen banks, except just upstream of Stony Point Rd; slopes ranging from 3:1 to 2:1.

Channel processes: Reach 4 is highly engineered and straightened with areas of limited incision (photo b) and deposition (photo c) throughout. Deposition isn't widespread throughout entire reach, but at key sites; decomposition of emergent vegetation seen throughout. At the downstream end of the reach, margin bars are beginning to develop on the western bank and closing channel (photo d).

Water quality (qualitative): moderate to poor, with many areas of open water containing significant algae growth (photo d) in March 2008.

BIOLOGICAL CONDITIONS

Instream habitat: Generally aquatic habitat is limited to a few isolated shallow pools or homogeneous shallow runs (photo d), as flow is diffuse through emergent vegetation and shallow.

Vegetation composition: Very little woody riparian vegetation exists along the channel margins or along the banks; riparian areas are generally composed of occasional willows or oaks, annual grasses, teasel, and blackberry with instream vegetation dominated by cattails and water plantain.

Riparian corridor and canopy closure: Very wide; between 75-200 ft. wide riparian corridor of undeveloped land on east bank; canopy closure between 0%-10%.

Listed species with potential to occur: Similar to Reach 5 and 6, low flows during March 2008 suggest that this reach goes partially dry during the summer, limiting the potential for listed amphibians and/or fish during the dry season when maintenance is likely to occur. Rodent burrows were observed on the banks and Roseland 4 is flanked by grasslands that very likely support CTS. Potential habitat for western pond turtle.

(c) Mid Reach 4 looking downstream, photo taken about 150 ft downstream of photo b and shows the channel much less incised with a wider, flatter profile. Flows are still moving through a heavily vegetated active channel with very little canopy (March 2008).

(d) Reach 4, looking upstream from Stony Point Rd. Linear trapezoidal alignment with gentle banks, narrow low flow channel inset into a wider and shallow stream bed. Channel pinches at downstream end due to a growing bar on the west/left. Note high level of algae growth in active channel (March 2008).

MANAGEMENT CONSIDERATIONS AND OPPORTUNITIES

Management considerations in this reach focus on increasing habitat availability on adjacent lands. There is still a rather wide undeveloped riparian/floodplain corridor along this reach, which, if restored, could provide substantial water quality and habitat benefits. This reach also maintains almost no canopy and could benefit significantly from development of a riparian canopy along the channel banks. Since the channel is choked in many locations with cattails and other emergent vegetation, key locations should be watched for impacts to flood conveyance or capacity. Since much of this reach is not directly adjacent to infrastructure, maintenance activities will likely only need to focus on the Stony Point crossing, where flood conveyance impacts could be problematic.

Kawana Creek – Reach 1 & Colgan Creek – Reach 7

JURISDICTION: Owned and maintained by SCWA

LOCATION: Kawana 1: Petaluma Hill Rd to Santa Rosa Ave

Colgan 7: Santa Rosa Ave to Corby Ave

ADJACENT LAND USE: New residential development in upstream section and commercial/industrial at downstream section; Colgan 7 passes under Hwy 101

UPSTREAM: Kawana Springs Creek (unmaintained)

LENGTH: Kawana1: 3,262 ft.

Colgan 7: 503 ft.

CHANNEL EASEMENT CORRIDOR WIDTH:

Kawana 1: 62 ft.

Colgan 7: 23 ft.

AVERAGE TOP-OF-BANK WIDTH: Kawana 1: 44 ft.

Colgan 7: 26 ft.

(b) Upper Kawana 1 looking downstream; Note the defined low flow channel with gravel bed and heavily vegetated banks. This naturalistic channel changes drastically as Kawana moves downstream and into Colgan 7 (see photos c and d) (Oct 2007).

MAINTENANCE HISTORY

(a) Looking upstream into box culvert at Petaluma Hill Rd (top of Kawana 1); Culvert is 2+ ft above channel grade and is clean of sediment (Oct 2007).

PHYSICAL CONDITIONS

Reach Setting: transition between the steep upper alluvial fan at base of Sonoma Mountain and the low gradient alluvial plain of central Santa Rosa. At lower end reach becomes concrete lined channel wedged between industrial and commercial development.

Active Channel: At the top of Kawana 1 the active channel is ~10ft wide with a 2-3ft wide low flow channel; in lower reach and Colgan 7 the channel flows through a rectangular open box culvert ~20ft wide.

Bank Structure: Upstream the banks are low and earthen with ~2:1 slopes; the banks remain earthen in most places until the channel goes into an underground culvert and is daylighted upstream of Santa Rosa Ave.

Bed Sediments/texture: Sediments become finer as gradient flattens; in the upper reaches sediments are gravels mixed with cobbles and coarse sand; in the lower reaches substrate is mainly fine sand, silt, and mud.

Water Quality: The channel was dry (October 2007) in most areas; where surface flows emerges flow is stagnant due to extensive vegetation in the channel.

Channel Processes: The upper portions of Kawana 1 appear to maintain some natural geomorphic patterns and appear to be efficiently transporting materials downstream; downstream reaches are constricted by

concrete bed and bank, and show signs of significant deposition along the concrete bed.

Biological Conditions

Instream habitat: Generally, in-stream habitat in these reaches is poor. The upper portions of Kawana 1 do contain gravels and other coarse sediments, but there is limited complexity and no surface water was present during the October 2007 surveys.

Vegetation Composition: The upper portion of Kawana 1 contains a mix of willows (native Arroyo willows), blackberries, and other ruderal vegetation both within the active channel and on the banks. Sections of upper Kawana 1 contain a narrow and dense band of riparian woodland along the northern bank. Lower Kawana (downstream of the underground culvert) is more or less devoid of a riparian corridor, this portion of the creek contains significant growth of cattails, willows, and other vegetation along the channel bottom. Finally, downstream of Hwy 101, Colgan 7 does contain a narrow strip of riparian woodland to the north of the creek.

Riparian corridor and canopy closure: upper Kawana 1 up to 25% canopy cover, lower Kawana 1 up to 75%; limited canopy if any on Colgan 7.

Listed species with potential to occur: potential habitat for western pond turtle.

(c) Lower Kawana 1 after it emerges from ~500 ft long underground pipe into industrial area adjacent to Colgan Ave. Channel is contained by 3 concrete walls (bed and banks) there is substantial growth of emergent and floating vegetation in the channel (Oct 2007).

(d) Colgan 7 looking downstream toward 101 crossing. Like the bottom of Kawana 1, the channel is confined by concrete on 3 sides; both fine muds and herbaceous vegetation cover the entire channel bottom (Oct 2007).

Management Considerations and Opportunities

The upper reaches of Kawana 1 (upstream of the underground culvert) do not appear to be in need of maintenance currently. The box culvert at Petaluma Hill Rd appears to be clean and no signs of recent flooding were observed in this area. Downstream, where the channel flows through an open concrete culvert (photo d) along Colgan Ave to the terminus of Colgan 7, the channel contains sediment deposition along the bed and at crossings. Although no signs of recent flooding were observed, this reach will likely continue to collect sediment and should be watched. Although the current riparian and stream resource value of lower Kawana and Colgan 7 is low, the portion between Petaluma Hill Rd. and the culvert could be improved by additional canopy enhancement along the southern bank as well as filling in the open portions of the northern bank.

Colgan Creek – Reach 6

JURISDICTION: SCWA owned and SCWA maintained easement

LOCATION: Corby Ave. to Hearn Ave.

ADJACENT LAND USE: Residential development to the north and east, with agriculture to the west.

UPSTREAM: Colgan 7

LENGTH: 3,182 ft

CHANNEL EASEMENT CORRIDOR WIDTH: 73 ft

AVERAGE TOP-OF-BANK WIDTH: 46 ft

(b) Mid Reach 6, looking downstream. Banks are steep and composed of earth and rip-rap; this is a straight section with limited in-channel deposition and open water; most of this reach looks more like photos a, c, and d, with open areas scattered in between (10/2007).

MAINTENANCE HISTORY

(a) Top of Reach 6, looking downstream from Corby Ave. In-channel cattails have been recently cut (photo from 10/5/07) and that the banks are concrete.

PHYSICAL CONDITIONS

Reach Setting: Downstream of Hwy 101, Reach 6 flows through the Santa Rosa plain toward the Laguna and is constrained by residential development on both sides in the upper portions of the reach and a mix of agriculture and residential in the lower reach.

Active Channel: The active channel is between 8-12 ft wide, 6-8 ft deep below banks, with flow depths 0.25 -1.5 ft. Low flow channel is either entire width of active channel (where instream veg and sediment are not clogging the channel) or as narrow as 2 ft in choked sections.

Bank Structure: This reach contains two dominant bank forms; steep 1:1 earthen with rip-rap at toe (photo b) or fully concrete banks (photo a).

Bed Sediments/texture: Bed material is a mix of eroding rip-rap (angular cobbles) and fine sand, silt and mud.

Water Quality: Surface water appears either murky or stagnant and algal in most places.

Channel Processes: Reach 6 appears to be a strongly depositional reach with bars forming along bends as well as punctuated in-channel bars throughout the reach, and upstream of Hearn Ave. crossing.

Colgan Creek – Reach 6

BIOLOGICAL CONDITIONS

Instream Habitat: Reach 6 exhibits a classic pattern of straight sections with slow moving, open water runs interrupted by sediment wedges or bars extending partially or completely across the channel. These bars are heavily vegetated (cattails had just been cut when the field assessment took place) and create diffuse flow, while the open water sections are backwatered by sediment and appear to provide limited quality habitat.

Vegetation Composition: The riparian corridor is narrow along the entire reach as both sides contain service roads. While willows (mostly arroyo) are found growing on bars and at the toe of slope, occasional oaks and other mesic riparian woodland trees exist along the top of bank. The earthen banks are generally covered by a thicket of blackberry.

Riparian corridor and canopy closure: 20-30 ft. wide corridor on each bank with sparse to poor closure (up to 25%).

Listed species with potential to occur: potential habitat for western pond turtle, moderate to highly likely occurrence of California tiger salamander.

(c) Mid Colgan Cr. Reach 6 looking downstream. Banks are hardened with concrete (at bends), cattails across the channel bottom have just been cut back, and a depositional bar is forming on the inside of the bend (Oct 2007).

(d) Lower Colgan Cr. Reach 6, looking upstream from Hearn Ave crossing. Channel is choked with cattails in the foreground with a backwater pool upstream in the background (Oct 2007).

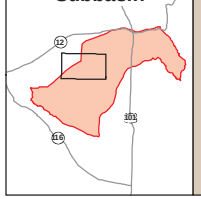
MANAGEMENT CONSIDERATIONS AND OPPORTUNITIES

During October 2007, SCWA conducted cattail removal throughout much of this reach (photos a, b and c). Limited canopy and significant deposition of fine sediments has created a situation that is conducive to explosive re-growth of cattails. Although no signs of recent bank overtopping were observed, channel capacity has been reduced by deposition and growth of emergent vegetation. Vegetation and sediment accumulation at the Hearn Ave. crossing should be carefully monitored and addressed to provide appropriate conveyance through the culvert. In addition to regular vegetation maintenance, focused sediment removal will likely be necessary at some point in the future. Although the creek cross-section is constrained by service roads, preliminary surveys suggest that there is room for canopy enhancement in areas where the banks are earthen (lower reach has the best opportunities).

Sonoma County Water Agency

Stream Maintenance Program

Roseland / Colgan Subbasin



Vegetation Type

- Blackberry Scrub
- Mixed Riparian Scrub
- Riparian Woodland (full canopy)
- Riparian Woodland (up to 75% canopy)
- Riparian Woodland (up to 25% canopy)
- Riparian Forest
- Ruderal
- Willow Scrub
- Developed
- SMP Maintenance Reaches

Sources:
Sonoma County Water Agency
County of Sonoma
AirPhotoUSA, 2005

FIGURE 4-25

Reaches and Vegetation

Roseland / Colgan (2 of 6)

0 500 1,000 1,500 2,000

Feet

1 inch equals 1,000 feet

Horizon WATER and ENVIRONMENT

Roseland Creek – Reaches 3 & 2

JURISDICTION: Mix of owned in-fee and owned by City of Santa Rosa with SCWA maintenance easement

LOCATION: Stony Point Rd. to ~500 ft downstream of Ludwig Ave.

ADJACENT LAND USE: Commercial/industrial to the north and mix of residential, agricultural, and DFG reserve to the east, west, and south.

UPSTREAM: Roseland 4

LENGTH: Roseland 3: 8,452 ft.

Roseland 2: 871 ft.

CHANNEL EASEMENT CORRIDOR WIDTH:

Roseland 3: 112 ft.

Roseland 2: 141 ft.

AVERAGE TOP-OF-BANK WIDTH: Roseland 3: 86 ft.

Roseland 2: 111 ft.

(b) Mid Reach 3, looking downstream, low flow channel is completely choked by cattail vegetation and flow is shallow and diffuse (March 2008).

MAINTENANCE HISTORY

(a) Reach 3, looking downstream from Stony Point Rd. Dense blackberries along banks recently removed by SCWA, depositional bar downstream of pool confines low flow channel. In distance, channel maintains a confined geometry as it meanders across sediment bars on both banks (March 2008).

PHYSICAL CONDITIONS

Reach setting: Reach 3 and 2 are heavily engineered reaches; flowing through the far southwestern corner of Santa Rosa and beginning the transition from the Santa Rosa Plain to the Laguna zone. These reaches are adjacent to a DFG Ecological Reserve, which drains into Roseland Cr.

Active channel: Diverse types including: wide and flat geometries (30 ft wide with a small, often confined, low flow channel of 3-5 ft wide (photos a and d)); and narrower more simple sections (with 5-10 ft active channel flanked by steep banks (photos b and c); water depths range from 1"-2 ft depending on channel type.

Bed sediments/texture: upper horizon is dominated by muds and organic matter (similar to reaches upstream), but bars and exposed banks show a mix of washed gravels and sand under the mud/muck.

Bank structure: Generally earthen with gently sloped banks at 3:1 at top of Reach 3 and bottom of Reach 2, with middle sections steeper at 2:1 or 1:1; see photo c.

Channel processes: Reaches contain a variety of channel geometries and geomorphic forms. At top of Reach 3 and bottom of Reach 2, channel contains a sinuous, confined low flow channel moving through a wide active channel, whereas

in the middle sections the channel is a single, straight, narrow active channel. Throughout both reaches Roseland Cr shows signs of significant sediment deposition with margin bars and d-shaped bars in many locations.

*Water quality (qualitative):*moderate to poor-turbid.

BIOLOGICAL CONDITIONS

Instream Habitat: In the upper portions of Reach 3, a sinuous low flow channel, myriad gravel bars, undercut banks, and root wads create the potential for good instream habitat (photo a); the rest of Reach 3 and most of Reach 2 are far less complex and contain degraded aquatic habitat (photos b, c and d). Although aquatic habitat conditions are not favorable to listed fish, there is habitat for a variety of amphibians, reptiles, and birds.

Vegetation composition: Woody riparian vegetation is nearly devoid from these reaches. Banks are dominated by annual grasses, thistle, fennel and other non-native herbs and instream environments are dominated by dense stands of cattails in shallower water (photos b and d) and algae and other floating vegetation in deeper areas (photo c)

Riparian corridor and canopy closure: 20-50 ft. wide corridor in most locations with a large adjacent floodplain complex at the DFG Reserve; canopy closure around 0% throughout.

Listed species with potential to occur: limited potential for listed fish as the water quality and flow conditions are poor; CTS use of bank burrows is highly likely due to the presence of the DFG Reserve and the swales draining it adjacent to the channel. Potential habitat for western pond turtle, Reach 3 is potential habitat for listed plants.

(c) Lower Mid Reach 3, looking downstream; unlike photo (b), here channel is straight and maintains its trapezoidal open flowing condition. The straightened channel appears to have a slightly higher gradient and is more effective at transporting sediment than other sections of this reach. This section is adjacent to DFG Ecological Reserve and appears to drain that reserve (March 2008).

(d) Reach 2, looking downstream toward Ludwig Ave. crossing. Reach 2 is similar to Reach 3 in having a wide floodplain, alternating sections that are choked by cattails and sections with open, unobstructed flow through a single low flow channel. For example, remnant pool in the foreground flows into a section choked by willows. This pattern is common in many of SCWA's engineered channels (March 2008).

MANAGEMENT CONSIDERATIONS AND OPPORTUNITIES

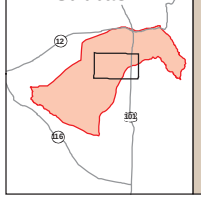
Management considerations include checking for sediment and vegetation removal downstream of Stony Point Rd. and upstream/downstream of Ludwig Ave. Although significant sediment deposition was noted

from several locations along these reaches, the size of the existing x-section and distance from infrastructure lessens the urgency in some locations. Other key places to watch include the developed section of upper Reach 3. Several sections of Roseland Cr. are choked with cattails and may present capacity issues in the future. Due to its location, and relatively light development footprint, Roseland Cr. has restoration potential to enhance a wide variety of species. Canopy enhancement along Reaches 3 and 2 would provide a significant benefit to a suite of species.

Sonoma County Water Agency

Stream Maintenance Program

Roseland / Colgan Subbasin



Vegetation Type

- Blackberry Scrub
- Mixed Riparian Scrub
- Riparian Woodland (full canopy)
- Riparian Woodland (up to 75% canopy)
- Riparian Woodland (up to 25% canopy)
- Riparian Forest
- Ruderal
- Willow Scrub
- Developed
- SMP Maintenance Reaches

Sources:
Sonoma County Water Agency
County of Sonoma
AirPhotoUSA, 2005

FIGURE 4-26

Reaches and Vegetation

Roseland / Colgan (3 of 6)

0 500 1,000 1,500 2,000

Feet

1 inch equals 1,000 feet

Horizon WATER and ENVIRONMENT

Colgan Creek – Reach 5

JURISDICTION: SCWA owned and SCWA easement; maintained by SCWA

LOCATION: Hearn Ave. to Bellevue Ave.

ADJACENT LAND USE: Agriculture at the top and bottom of the reach with industrial development in the middle of the reach

UPSTREAM: Colgan 6

LENGTH: 7,720 ft

CHANNEL EASEMENT CORRIDOR WIDTH: 106 ft

AVERAGE TOP-OF-BANK WIDTH: 46 ft

(b) Mid Reach 5, looking upstream. Concrete banks narrow the channel, vegetation growing throughout low flow channel. Just downstream of this site there are 2 access roads (one on each bank) that enter the stream channel (Oct 2007).

MAINTENANCE HISTORY

(a) Looking downstream from Hearn Ave. Banks are hardened with grouted rip-rap. Recent blackberry removal (2007) exposes a wedge of sediment along the toe-of-bank on right (Oct 2007).

PHYSICAL CONDITIONS

Reach Setting: Reach 5 is generally a linear trapezoidal channel, with several sections of hardened bank, channel is confined by access/service roads, and heavily impacted by sediment deposition and vegetation growth in locations throughout channel.

Active Channel: Channel bed is 6-12 ft wide depending on level of sediment aggradation, ~8-12 ft deep, surface flow is generally absent in downstream sections and less than 18" deep when present.

Bank Structure: Hardened in most places, with either concrete or grouted rip-rap. Where earthen, generally steep (<2:1), covered by blackberry, with small patches of instability apparent in some locations.

Bed Sediments/texture: Dominated by fine materials such as silts and muds with some sloughing rip-rap providing coarser substrate along areas with earthen banks.

Channel Processes: This reach has been significantly modified, contains two grade control structures (downstream of Victoria Ct. and adjacent to High School); the pattern of increased deposition of fine sediment continues until the channel turn 90 degrees to the west at Bellevue Ave.

Water Quality: In areas where open water was present in October 2007, water was stagnant and full of algae and/or duckweed.

Colgan Creek – Reach 5

BIOLOGICAL CONDITIONS

Instream Habitat: Generally poor habitat due to highly constrained system, extensive sediment deposition, and isolated and stagnant open-water sections make for poor instream habitat conditions. In the upper 2/3 of the reach, the channel is choked with cattails or blackberries

Vegetation Composition: Band of willows (native Arroyo willows and non-native weeping willows) along the toe of the slope throughout most of reach. Fringe of emergent wetland vegetation adjacent to willows, with rice cutgrass, watercress, and patches of cattails. Mixture of native and non-native trees at top of bank and along access road, including coast live oak, Monterey pine. Upper banks support shrubby vegetation dominated by non-natives such as Himalaya blackberry and cotoneaster, with ruderal herbaceous vegetation dominated by Harding grass interspersed.

Riparian corridor and canopy closure: where riparian woodland is present canopy is sparse and discontinuous, generally less than 25%.

Listed species with potential to occur: potential habitat for western pond turtle, highly likely occurrence of CTS.

MANAGEMENT CONSIDERATIONS AND OPPORTUNITIES

Much of Reach 5 contains steep hardened banks. Due to the amount of blackberry covering most banks and stretching across the channel, assessment of bank stability was difficult. Between the dense blackberry and dense stands of cattails, future management of this reach is likely to focus on vegetation maintenance. There are numerous vegetated sediment wedges that may need to be removed if they continue to expand and present flood capacity issues. Although there is scattered canopy throughout the reach, additional planting of canopy trees would restrict growth of emergent vegetation in the channel and provide habitat for a variety of riparian species. Sediment removal activities are focused to downstream of Hearn Ave. (photo a) and upstream of Bellevue Ave (photo e) where a crossing is significantly blocked.

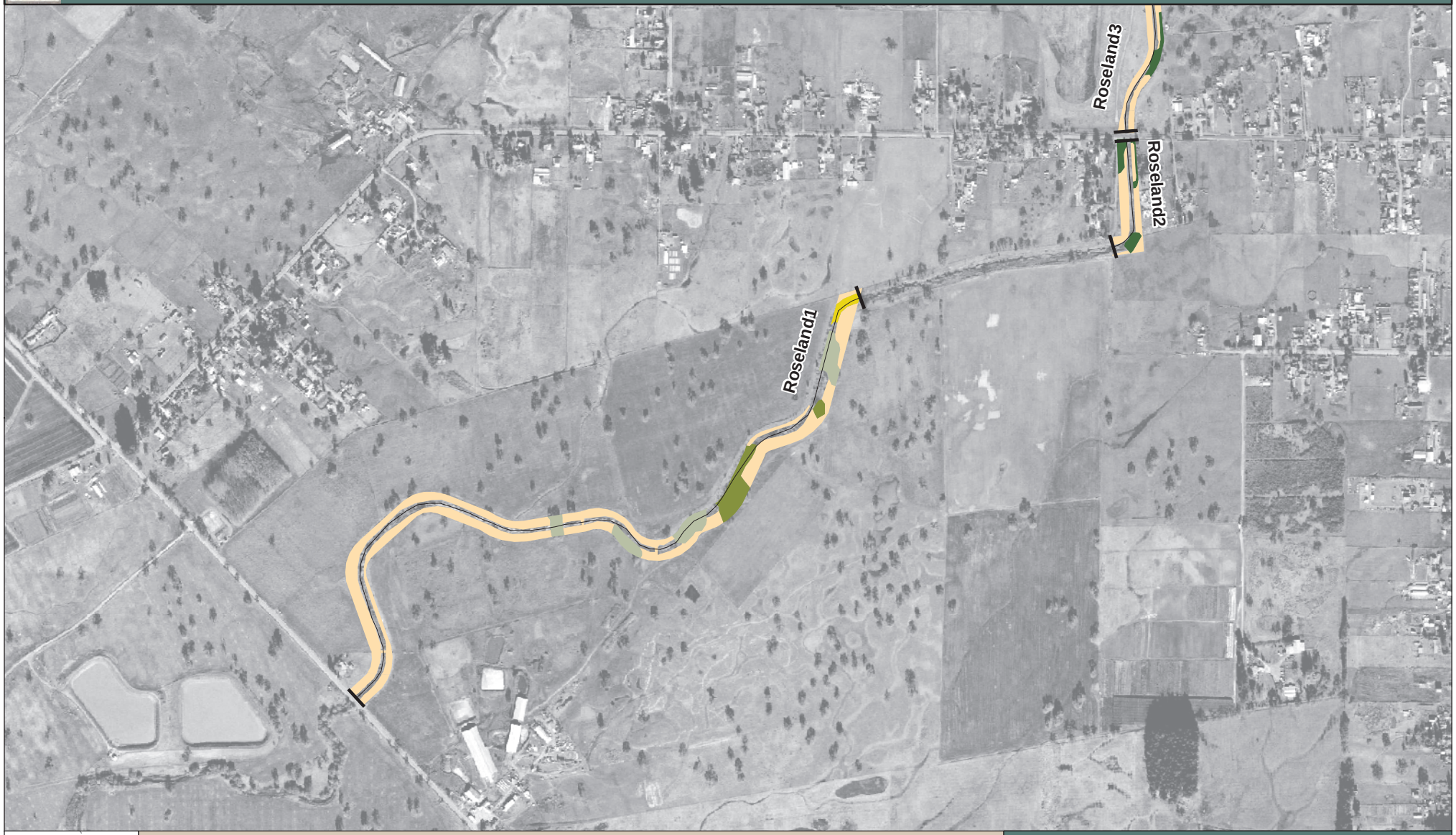
Photo (e) at right: Lower Colgan 5, looking downstream to Bellevue Ave. crossing near the High School. Aggrading sediment along bank to left and in mid-channel bar block entrance to box culverts beneath Bellevue Ave.

(c) Mid-reach, looking upstream, downstream of photo b. Typical non-concrete section of Reach 5. Note rip-rap at the toe of slope on the left and the steep blackberry covered bank on the right. Cattail choked section in the background and open-water in the foreground. This sequence is common throughout the reach (Oct 2007).

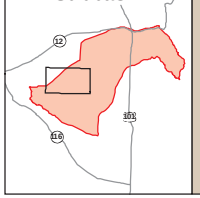
(d) Lower Colgan 5, looking downstream from Dutton Meadow crossing, near the High School. The channel is dry in this section and the low flow channel is clearly defined by a fine sand and caked mud substrate. Notice that the banks are wider and more gently sloped in this section than upstream.

Sonoma County Water Agency

Stream Maintenance Program



Roseland / Colgan Subbasin



Vegetation Type

- Blackberry Scrub
- Mixed Riparian Scrub
- Riparian Woodland (full canopy)
- Riparian Woodland (up to 75% canopy)
- Riparian Woodland (up to 25% canopy)
- Riparian Forest
- Ruderal
- Willow Scrub
- Developed
- SMP Maintenance Reaches

Sources:
Sonoma County Water Agency
County of Sonoma
AirPhotoUSA, 2005

FIGURE 4-27

Reaches and Vegetation

Roseland / Colgan (4 of 6)

0 500 1,000 1,500 2,000

Feet

1 inch equals 1,000 feet

Horizon WATER and ENVIRONMENT

Roseland Creek – Reach 1

JURISDICTION: Owned by SCWA

LOCATION: From Llano Rd. crossing upstream 5990 ft

ADJACENT LAND USE: Pasture and open grazing land

UPSTREAM: Immediate upstream reach is neither owned nor maintained by SCWA; SCWA's Reach 2 is 1200 ft further upstream.

LENGTH: 6,058 ft

CHANNEL EASEMENT CORRIDOR WIDTH: 156 ft

AVERAGE TOP-OF-BANK WIDTH: 137 ft

(b) Approx. 1000 ft upstream of Llano Rd. Similar to photo (a) cattails are growing across the lower wet channel area, the channel banks are gently sloping, no significant riparian canopy (March 2008).

MAINTENANCE HISTORY

(a) Approx. 2500 ft upstream of Llano Rd. Creek is a broad trapezoidal channel, with gentle sloping banks, grassy banks have little to no woody vegetation, in-channel vegetation dominated by cattails (March 2008).

PHYSICAL CONDITIONS

Reach setting: this is the most downstream reach of Roseland Cr that SCWA has maintenance authority. The Laguna de Santa Rosa confluence is 1.8 mi downstream. Reach occurs in the gently sloping western side of the Santa Rosa Plain. Adjacent pasture/grazing land uses occupy historic floodplain area. Current channel cross section is large and broad enough to contain most annual peak flows. The increased channel cross sectional area has led to in-channel sedimentation.

Active channel: low flow channel is ~10-14 ft wide and less than ~1 ft deep in most places; the Ordinary High Water Mark includes a channel width of 50-60 ft. 6 instream cattle crossings cross the channel through the lower reach.

Bed sediments/texture: medium and fine sands and silt

Bank structure: slopes are earthen, grass covered, and very gently sloped (< 3:1) (photos a and b).

Channel processes: lower reach is generally aggrading, with culverts below channel bed elevations in most places; sediment appears to be distributed evenly with aggradation slowly building behind Llano Rd bridge.

Water quality (qualitative): flow was relatively clear in March 2008; observed again in May 2008, fencing keeps cattle to within the crossing corridors (photo c), but instream crossings mean cattle do actively cross the channel,

several crossing show signs of recent trampling and potential water animal waste loading.

BIOLOGICAL CONDITIONS

Instream habitat: Generally aquatic habitat is limited to a few isolated shallow pools directly upstream and downstream of crossings. Habitat is dominated by a pattern of long shallow runs/glides (photo a) or diffuse flow through cattails (photo b).

Vegetation composition: Vegetation composition is mix of cattails instream and annual grass with patches of fennel and thistle along the wide and gentle sloped wide banks. There are a few isolated, small patches of willow in the upper sections of the reach.

Riparian corridor and canopy closure: Riparian canopy is limited to small patches of willows and an occasional oak along the banks or channel margins. The majority of the reach has no canopy cover or closure with a few isolated areas with limited canopy.

Listed species with potential to occur: limited potential for listed amphibians and/or fish in aquatic habitat during the dry season when maintenance is likely to occur due to drier channel conditions. This reach is surrounded by extensive grassland and oak savannah, there are a number of ponds nearby, and several rodent burrows. As such, there is a high probability of the adjacent uplands providing terrestrial habitat for California Tiger Salamander (CTS). Potential habitat for western pond turtle and listed plants.

(c) Reach 1 approximately 2500 ft upstream of Llano Rd. Reach 1 includes 6 cattle crossings similar to photo (c). Culverts are typically clogged with sediment, compacted from the load of the road crossing, and many of the culverts are broken open and are posing safety threats to the cattle (as shown in photo) (March 2008).

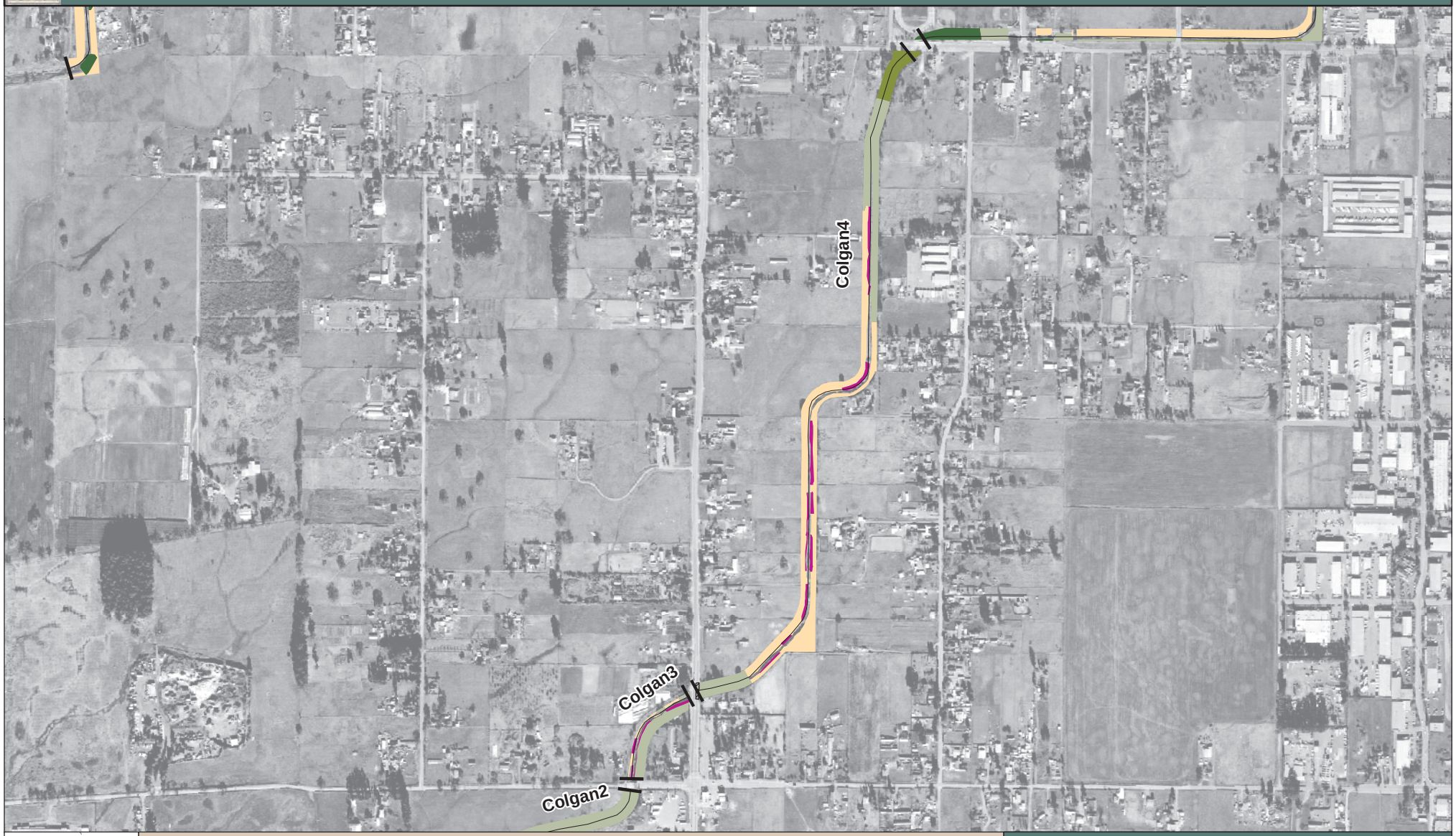
(d) At Llano Rd Bridge. Two large willows and stumps impede flow and block the Llano crossing. Recent high water marks (observed 03/08) indicate that conveyance through crossing is reduced by the current vegetation growth (March 2008).

MANAGEMENT CONSIDERATIONS AND OPPORTUNITIES

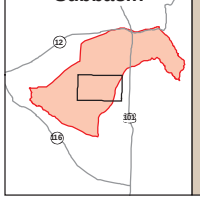
Management considerations for Roseland Reach 1 focus on the replacement of the existing culverts at the 6 cattle crossings that are damaged, broken open, or filled with sediment. Options could include removal of existing culvert and replacement with a larger culvert set at the new bed elevation and/or the potential reduction in number of crossings. Vegetation maintenance will be necessary at the Llano Rd. bridge to ensure that high flows can move effectively through the crossing. High water marks were observed in March 2008 within a few feet of the road surface. This reach has great potential for restoration. Adjacent habitat supports a wide variety of grassland and savannah species and observations indicate that riparian planting would provide high quality habitat for a suite of riparian birds and related wildlife.

Sonoma County Water Agency

Stream Maintenance Program



Roseland / Colgan Subbasin



Vegetation Type

- Blackberry Scrub
- Mixed Riparian Scrub
- Riparian Woodland (full canopy)
- Riparian Woodland (up to 75% canopy)
- Riparian Woodland (up to 25% canopy)
- Riparian Forest
- Ruderal
- Willow Scrub
- Developed
- SMP Maintenance Reaches

Sources:
Sonoma County Water Agency
County of Sonoma
AirPhotoUSA, 2005

FIGURE 4-28

Reaches and Vegetation

Roseland / Colgan (5 of 6)

0 500 1,000 1,500 2,000

Feet

1 inch equals 1,000 feet

Horizon WATER and ENVIRONMENT

Colgan Creek – Reaches 4 & 3

JURISDICTION: Owned and maintained by SCWA

LOCATION: Colgan 4: Bellevue Ave. to Stony Point

Colgan 3: Stony Point to Todd Rd.

ADJACENT LAND USE: Predominantly agriculture with limited industrial and residential development

UPSTREAM: Colgan 5

LENGTH: Colgan 4: 5,459 ft.

Colgan 3: 816 ft.

CHANNEL EASEMENT CORRIDOR WIDTH:

Colgan 4: 129 ft.

Colgan 3: 114 ft.

AVERAGE TOP-OF-BANK WIDTH: Colgan 4: 70 ft.

Colgan 3: 65 ft.

(b) Mid Reach 4, looking upstream. Channel is dry with exposed channel bed dominated by rip-rap (angular rocks). Low flow channel is clearly delineated and banks are steep and covered with annual grasses or blackberries. (Oct. 07)

MAINTENANCE HISTORY

(a) Reach 4, looking downstream from Bellevue Ave. crossing. Water observed, dry upstream in Reach 5. Open water is murky, but banks have increased riparian cover and shade. (Oct. 07)

PHYSICAL CONDITIONS

Reach Setting: Low gradient reach in agricultural lands of lower SR Plain; the channel has been straightened and appears slightly incised. Colgan Cr. Trail follows the eastern bank for much of Reach 4.

Active Channel: Active channel ranges from 6-10 ft wide, and 6-10 ft. deep below banks; surface water present in upper portions of Reach 4, with remaining reach dry in Oct. 2007.

Bank Structure: Banks are rocked at the toe of slope on all banks that could be inspected. Above the toe there is a mix of earth and rip-rap. Banks are steep and covered by blackberry in most places.

Bed Sediments/texture: Channel bed is either dominated by eroded rip-rap (angular cobbles-photo b) or fine silts and mud.

Water Quality: Where surface water exists in the low flow season, flow is slow and often stagnant.

Channel Processes: Throughout reach channel alternating pattern with occasional depositional patches where vegetation grows in the channel, followed by incised section where banks are steep and channel is straight.

BIOLOGICAL CONDITIONS

Instream habitat: For most of this reach instream habitat is intermittent with perennial flows isolated into small stagnant pools. The habitat that exists is devoid of complexity and is limited to steep rocked banks with a rip-rap or silty mud bed.

Vegetation composition: Mixture of native and non-native trees at top of bank and along access road, including coast live oak, Monterey pine, and others. Canopy is generally denser in these reaches than in Reach 5. In addition to the trees at top of bank, banks also support shrubby vegetation dominated by non-natives such as Himalaya blackberry and cotoneaster, with ruderal herbaceous vegetation dominated by Harding grass interspersed. A dense thicket of blackberry covers the banks throughout this reach.

Riparian canopy and corridor closure: Upper Reach 4, canopy closure is patchy, up to 25% of channel, lower Reach 4 little canopy closure with mostly ruderal bank vegetation, Reach 3 – up to 25% closure

Listed species with potential to occur: High likelihood for occurrence of California tiger salamander, potential habitat for western pond turtle

(c) Mid Reach 4, looking upstream, downstream of photo b. Channel in near ground blocked with cattails, then becomes open water section in distance, then blocked again with cattails - with pattern repeating through reach. Banks are steep and completely covered in blackberry. (Oct. 07)

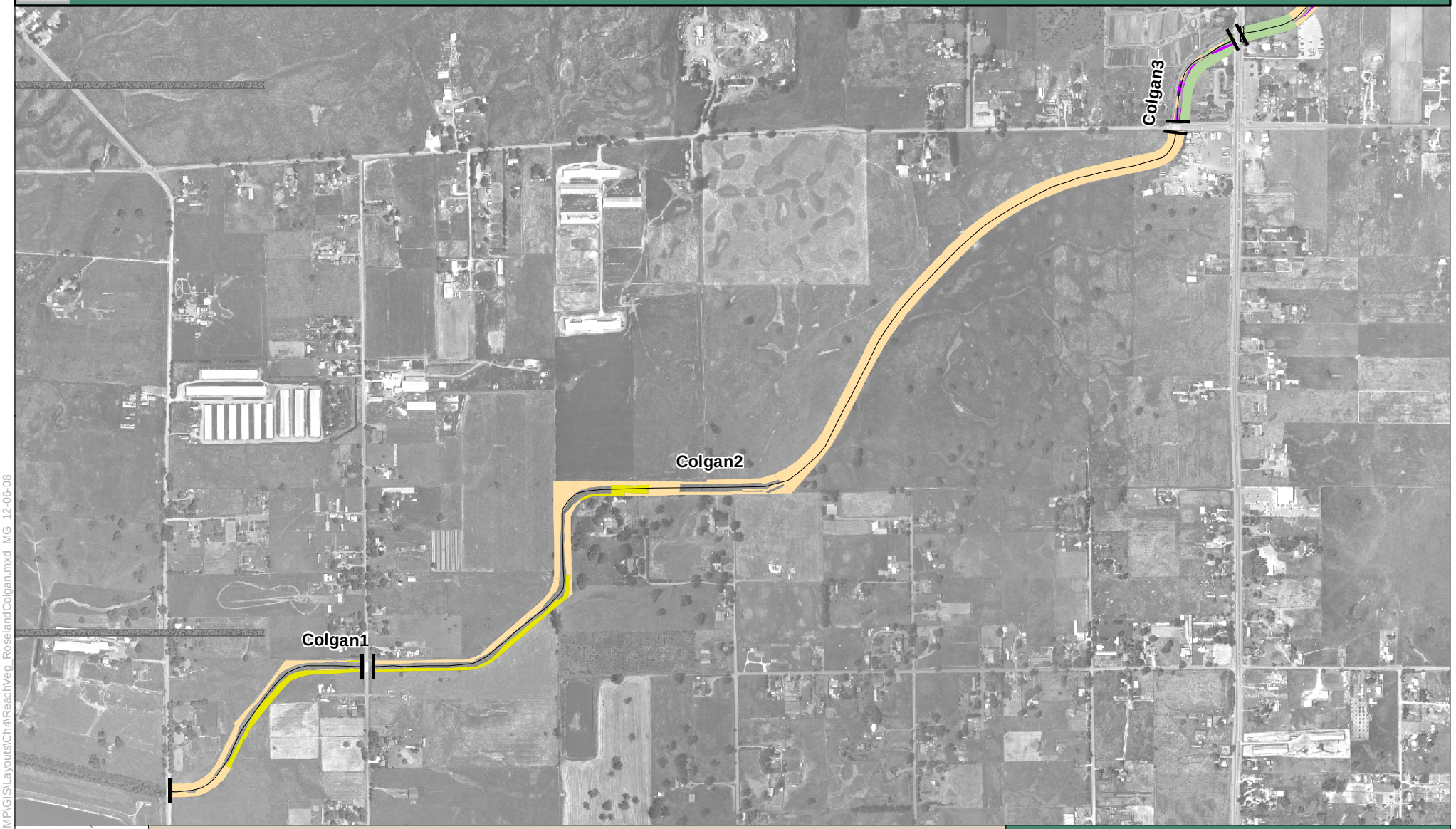
(d) Colgan 3, looking upstream from Todd Rd. channel is dry. Low flow channel is obscured by willows and emergent vegetation. Where vegetation opens, the low flow channel is defined, mix of gravel, fine sand and caked mud. (Oct. 07)

MANAGEMENT CONSIDERATIONS AND OPPORTUNITIES

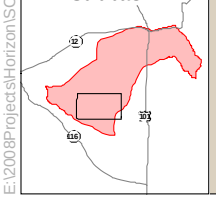
Like Colgan Cr. Reach 5, assessment of bank conditions in Reaches 4/3 was difficult based on the thicket of blackberry covering most banks. Vegetation management will likely be necessary in the near future to increase channel capacity and assess bank conditions. Current maintenance efforts should focus on clearing the sediment wedge and willows growing at the upstream end of the Stony Point crossing. Removal of blackberries and replacement with native trees and shrubs could improve habitat conditions for a suite of riparian species along much of the reaches.

Sonoma County Water Agency

Stream Maintenance Program



Roseland / Colgan Subbasin



Vegetation Type

- Blackberry Scrub
- Mixed Riparian Scrub
- Riparian Woodland (full canopy)
- Riparian Woodland (up to 75% canopy)
- Riparian Woodland (up to 25% canopy)
- Riparian Forest
- Ruderal
- Willow Scrub
- Developed
- SMP Maintenance Reaches

Sources:
Sonoma County Water Agency
County of Sonoma
SCWA Imagery 2006
Geografika Consulting

FIGURE 4-29

Reaches and Vegetation

Roseland / Colgan (6 of 6)

0 500 1,000 1,500 2,000

Feet

1 inch equals 1,000 feet

Horizon WATER and ENVIRONMENT

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Colgan Creek – Reaches 2 & 1

JURISDICTION: Owned and maintained by SCWA

LOCATION: Colgan 2: Todd Rd. to Walker Rd.

Colgan 1: Walker Rd. to Llano Rd.

ADJACENT LAND USE: Agriculture, predominantly dairy cow pasture

UPSTREAM: Colgan 3

LENGTH: Colgan 2: 7,918 ft.

Colgan 1: 1,873 ft.

CHANNEL EASEMENT CORRIDOR WIDTH:

Colgan 2: 122 ft.

Colgan 1: 120 ft.

AVERAGE TOP-OF-BANK WIDTH: Colgan 2: 85 ft.

Colgan 1: 78 ft.

(b) Reach 2, looking upstream from Walker Rd. Channel is dry and filled with cattails and annual grasses. Notice the shallow, wide, and straight channel configuration (Oct 2007).

MAINTENANCE HISTORY

(a) Top of Reach 2 looking downstream from Todd Rd. Channel is dry and covered bank to bank with annual vegetation (grasses and forbs). Channel cross-section is much wider with long sloping banks than upstream Reaches 3/4. In Reach 2, Colgan Cr. begins to take on more of a wider Laguna type channel form (Oct 07).

PHYSICAL CONDITIONS

Reach Setting: These reaches transition from the mid Santa Rosa alluvial plain to Laguna. Channel is straightened for flood control and agriculture, but is wider and shallower than the upstream reaches and appears to experience backwatering from the Laguna during high flows.

Active Channel: Active channel grows wider through Reach 2 (to 15-20 ft wide), then tapers to 10-12 ft. in Reach 1. Channel is wide with shallow banks and a wide flat bed and is completely covered with grasses through much of the reaches (see photo b).

Bank Structure: Banks are gently sloping, mostly earthen, and shallow (~3-5 ft high).

Bed Sediments/texture: Bed texture is dominated by fine silts and mud (see photo c)

Water Quality: No surface water was present during assessment (October 2007)

Channel Processes: Reach 2, unlike Reach 3, shows no apparent signs of recent incision. Due to the gradient, these reaches appear to be aggrading from fine sediment deposition and/or backwatering of fines from the Laguna.

Colgan Creek – Reaches 2 & 1

BIOLOGICAL CONDITIONS

Instream habitat: In October 2007, there was no aquatic habitat observed in either reach due to the lack of surface flow or pools. The channel has been straightened and its current configuration lacks any sort of complexity. There was no evidence of pools, riffles, woody debris, or significant riparian canopy.

Vegetation composition: Riparian canopy is sparse with scattered willows, oaks, and other canopy species throughout most of Reach 2. After the 90 degree southward bend in Reach 2, woody riparian growth becomes more dense down through Reach 1; canopy here is dominated by a narrow band of willow along the toe of slope. Downstream of Reach 1, the final reach of Colgan before it hits the Laguna contains a dense canopy of willows, alders, and oaks with nearly 100% canopy cover (photo d).

Riparian canopy and closure: Sparse canopy in upper Reach 2 (<15%), becoming more dense into lower Reach 2 and Reach 1 (up to 75%, and near complete canopy in some locations).

Listed species with potential to occur: Ponds and mound topography on adjacent pasture land suggest potentially suitable habitat for CTS, which is highly likely to occur. Potential habitat for western pond turtle. Mud swallow nests observed under Walker Rd. bridge. Reach 2 is potential habitat for listed plant species.

(c) Lower Reach 2, under Walker Rd. Bridge. Exposed channel desiccated with dried mud blocks. (Oct. 07)

(d) Looking downstream from Llano Rd. to non-SCWA maintained lower Colgan Creek. This section maintains a dense riparian corridor until it reaches the Laguna proper approximately ½ mile downstream. The channel was dry in October, 2007 from the top of Reach 2 to the bottom of Reach 1 (Oct 2007).

MANAGEMENT CONSIDERATIONS AND OPPORTUNITIES

Reach 2 and Reach 1 do not appear to have any immediate maintenance needs. The majority of the in-channel vegetation is annual grasses, which should not create a roughness issue and reduce flow capacity. The bridge heads at Walker and Llano roads appear to have capacity without flow constriction or adverse sediment deposition. Riparian canopy is sparse in many portions of Reach 2 and 1 and additional canopy could provide needed habitat for local and migratory riparian species as well as provide shade to retard growth of in-channel vegetation. Due to the proximity to pastureland with ponds and pools, this reach should be managed with CTS aestivation/underground habitat in-mind.