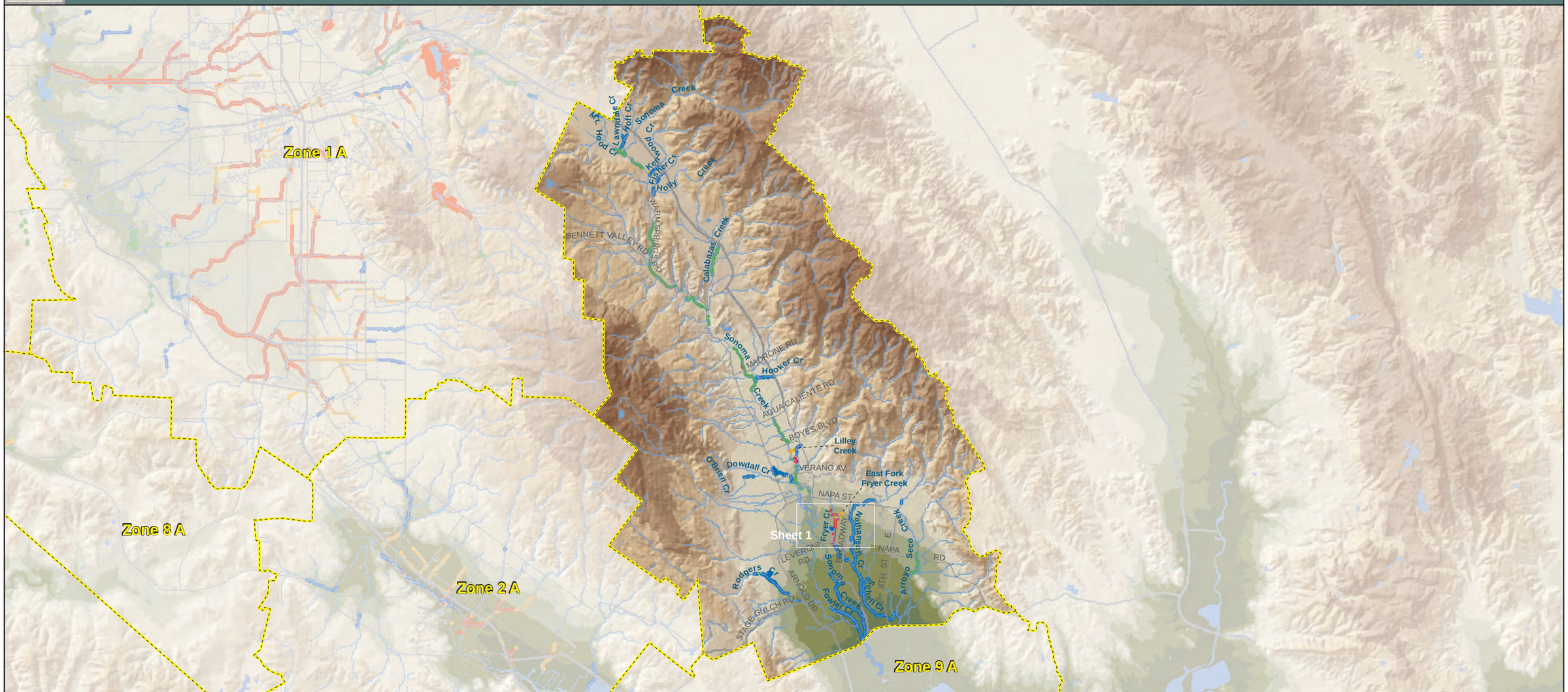
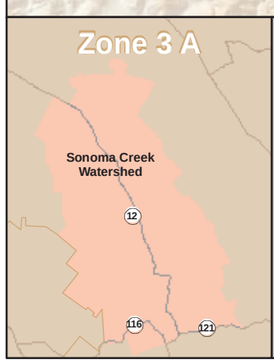
Sonoma County Water Agency

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 4-48

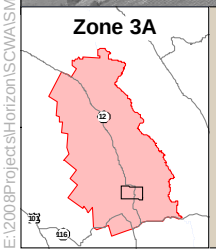
Sonoma Creek Watershed

0 1 2 3 4
Miles
1:160,000

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
AirPhotoUSA, 2005

FIGURE 4-49

Reaches and Vegetation

Zone 3A (1 of 1)

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\Ch4\ReachVeg_Zone3A.mxd MG 12-08-08

Fryer Creek – Reaches 4, 3, 2 & East Fork – Reach 1

JURISDICTION: Owned and maintained by SCWA, small portion of E. Fork is maintained through easement

LOCATION: Downtown Sonoma between Andriex St. and MacArthur St.

ADJACENT LAND USE: Residential

UPSTREAM: Non-SCWA maintained drainage/swale (~1000 ft)

LENGTH: Fryer 4: 124 ft.

Fryer 3: 602 ft.

Fryer 2: 478 ft.

East Fork 1: 683 ft.

CHANNEL EASEMENT CORRIDOR WIDTH:

Fryer 4: 67 ft.

Fryer 3: 26 ft.

Fryer 2: 68 ft.

East Fork 1: 101 ft.

AVERAGE TOP-OF-BANK WIDTH: Fryer 4: 41 ft.

Fryer 3: no data

Fryer 2: 49 ft.

East Fork 1: 80 ft.

(b) Reach 3, looking downstream (east) from 4th St W. Sediments collect at the toe of the bank, along the channel margin, pinch the active channel, creating a confined low flow channel (Nov 2008).

MAINTENANCE HISTORY

(a) Reach 4, looking downstream toward Andriex St. crossing. Erosion scar on the right bank adjacent to the box culvert. Also note small bars forming in this reach just upstream of the culvert (Nov 2008).

PHYSICAL CONDITIONS

Reach setting: Fryer creek runs north to south through the southwestern portion of the City of Sonoma. This creek system appears to be completely disconnected from a larger watershed, as upstream of Reach 4 the channel quickly turns to a small swale and then ends at W. Napa Street. Through these reaches the channel is heavily confined by development on both sides of the creek. Fryer Creek is a tributary to Nathanson Cr, which drains into Sonoma Cr.

Active channel: 8-10 ft wide in most locations (photo b and d), with the exception of the confluence area in photo c and downstream to Reach 1 where the channel opens to ~16-18 ft wide; depths range from 2”-2’ (photo a and c, respectively).

Bed sediments/texture: generally dominated by fine sands and silts.

Bank structure: mostly earthen with isolated areas of rip-rap and gently sloping banks.

Channel processes: Channel receives flows and sediment from a small urbanized catchment. Most of Reaches 4, 3, 2, and the E. Fork Reach 1 show signs of deposition with a low flow channel flowing through a vegetated channel bottom (photos a and d) or a low flow channel cutting through in-channel deposits.

Water quality (qualitative): moderate in November 2008, with limited stagnation and flows somewhat turbid or greenish.

BIOLOGICAL CONDITIONS

Instream habitat: Aquatic habitat is limited by a lack of complexity in these reaches. Most areas have shallow diffuse flow with no pools or riffles and no other features that would provide aquatic habitat. The confluence of Reach 2 and the E. Fork is the only area with deep water and significant stands of emergent vegetation (cattails). This system also appears to be completely disconnected from any upstream watershed, so it is unlikely to function as a migration corridor for aquatic species.

Vegetation composition: These reaches support only scattered trees, most of which are planted redwoods (photo b) or other landscaped varieties. Most of the vegetation is herbaceous with grasses dominating the banks (photo b and d) and an array of grass and blackberries with some sedges and other herbs growing in the active channel.

Riparian corridor and canopy closure: none

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

(c) Fryer Cr. Reach 2, at the confluence with the East Fork. The section of channel downstream of the confluence is unique within the Fryer system as this is one of the only areas where the channel is wide, open, and full of cattails (Nov 2008).

(d) East Fork of Fryer Creek, Reach 1, looking downstream from 2nd Street W. Flow is diffuse through vegetation covering the active channel; there is no canopy of trees in this reach. Also note the relatively narrow channel easement and proximity to residences (left) (Nov 2008).

MANAGEMENT CONSIDERATIONS AND OPPORTUNITIES

Management considerations for Fryer Creek Reaches 4, 3 and 2 and Reach 1 of the E. Fork should be determined based on flood conveyance. Observations in November 2008 did not suggest that the current extent of sediment bars and in-channel vegetation are presenting a flood capacity issue. These observations should be checked and at least Reach 2 should be monitored annually for future consideration of sediment removal. Also, sediment bars upstream of the crossing at the confluence of the E. Fork and Reach 2 should be checked periodically as the wedge of sediment at this site appears to be aggrading and may pose a flood management issue in the future. The same is true for the crossing at Reach 4, although this site does not appear to receive much flow. These reaches could all benefit from canopy enhancement and removal of non-native vegetation species.

Fryer Creek – Reach 1

JURISDICTION: Owned and maintained by SCWA

LOCATION: W. MacArthur St. to Todd Ave. pedestrian bridge

ADJACENT LAND USE: Residential

UPSTREAM: Non-SCWA maintained drainage/swale (~1000 ft)

LENGTH: 2,805 ft

CHANNEL EASEMENT CORRIDOR WIDTH: 70 ft

AVERAGE TOP-OF-BANK WIDTH: 51 ft

(b) Middle of Fryer 1, looking downstream. Sediment collects at toe of bank, along channel margin to left; sediment also collects in mid-channel bar in distance; channel cross-section is much larger here than upstream sections in Reaches 3 and 2 (Nov. 2008).

MAINTENANCE HISTORY

(a) Fryer Cr. top of Reach 1, looking downstream from MacArthur St. crossing. Cobble bar on the left extends into channel. Large cobbles locally derived from sloughed banks. Bank on the right is grouted for at least 150 ft (Nov. 2008).

PHYSICAL CONDITIONS

Reach setting: Fryer creek runs north to south through the southwestern portion of the City of Sonoma. This Reach is straight and runs to the southern boundary of the City. Although the gradient is generally gentle, it appears to flatten near the lower end of the reach with sediment deposition increasing downstream.

Active channel: 16-18 ft wide with a low flow channel ranging from 14 ft (photo b) to 6 ft (photo d); channel depths are 8-14 ft; flow depths range from 2”-3 ft.

Bed sediments/texture: generally dominated by fine sands and silts, with sloughed cobbles in locations (photos a/c).

Bank structure: earthen with rip-rap cover throughout; some sections with grouted rip-rap (photo a) and sacrete (photo c).

Channel processes: Reach 1 is receiving urban runoff from upstream reach, due to its straight alignment and moderate gradient, channel appears to effectively convey sediments through its upper sections. Moving downstream, sediment deposition and bar formation increase with alternating d-bars through the bottom of the reach (photo d). Periodic grade control features are common in this reach and it is not clear whether they were engineered or developed in-situ (photo

a, c and d) from sloughing local rock materials.

Water quality (qualitative): moderate in November 2008, with limited stagnation and flows generally clear.

BIOLOGICAL CONDITIONS

Instream habitat: Aquatic habitat complexity and function increases moving downstream. In the upstream sections of Reach 1, the channel is confined between grouted banks and aside from eroded rip-rap displays little in the way of complexity. In the middle and lower sections, deep runs (photo b), pools, and riffles occur in relation to sediment bars. Also, unlike the upstream reaches, Reach 1 maintains shaded conditions for much of its length.

Vegetation composition: Reach 1 supports a dense, narrow, riparian canopy for much of its length. The only area that is devoid of riparian canopy is the western bank at the top of the reach (photo a). Riparian trees include maples, alders, redwoods, firs, and other conifers. Understory is generally limited to grasses and duff under the dense canopy. In channel vegetation is also limited to shade tolerant herbaceous species thriving on the channel margins and on the sediment bars.

Riparian corridor and canopy closure: Riparian canopy closure is around 50% through most of the reach, with some areas of between 25%-50% (photos a and b) and some areas higher than 50% (photos c and d).

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

(c) Fryer Creek Reach 1, looking upstream from mid reach. Sacrete used to strengthen bank to left, rock and log creating gradient break in stream (near ground) with pooling upstream, and faster flow downstream (Nov, 2008).

(d) Lower Fryer Cr. Reach 1, looking upstream from the pedestrian bridge adjacent to Todd Ave. Riparian canopy now greatly expanded; in-channel sediment/bar formations also more strongly developed in the lower reach (Nov, 2008).

MANAGEMENT CONSIDERATIONS AND OPPORTUNITIES

Management considerations for Fryer Creek Reach 1 focus on sediment management in the lower sections of the reach. Field observations suggest that current conditions are not problematic for flow conveyance and capacity, but if sediment bars continue to aggrade they could be problematic in the future. Very few other maintenance issues were observed during field reconnaissance in November 2008.

Nathanson Creek – Bypass

JURISDICTION: Owned by City of Sonoma, maintained via easement

LOCATION: Adjacent to Fine Ave. and parallel to Dewell Dr.

ADJACENT LAND USE: Nathanson Cr. Park, and Residential

UPSTREAM: Modified reaches, non-maintained by SCWA

LENGTH:

CHANNEL EASEMENT CORRIDOR WIDTH:

AVERAGE TOP-OF-BANK WIDTH:

(b) From top of Nathanson Bypass, looking downstream. Notice the bypass is simply a wide trapezoidal channel. SCWA conducted vegetation maintenance in the summer of 2008 leading to the conditions observed in November 2008.

MAINTENANCE HISTORY

(a) Nathanson Creek looking downstream to inlet of the bypass channel (to left) and the Nathanson Cr. channel (to right) Nov, 2008.

PHYSICAL CONDITIONS

Reach setting: Nathanson Creek is a modified channel flowing north to south through the City of Sonoma. The bypass channel (located in Nathanson Cr. Park) provides stormwater diversion when flood waters are high enough to enter the inlet (photo a) and inundate the wide gradient bypass (photo b).

Active channel: ~30-40 ft from toe to toe, shallow depth 2-4 ft.

Bed sediments/texture: generally a mix of gravel and coarse sand with finer material deposited behind stumps.

Bank structure: very wide channel with gentle trapezoidal banks, banks are earthen.

Channel processes: The inlet elevation is set by the bed elevation of the inlet (photo a) when water rises in Nathanson Cr and enters the inlet, flows then enter the bypass. The bypass is wide and maintains a very low gradient (photos b and c); at downstream end of bypass, the channel narrows, steepens, and meets the creek again (photo d).

Water quality (qualitative): dry unless flooding, channel mostly collects leaf litter

Nathanson Creek – Bypass

BIOLOGICAL CONDITIONS

Instream habitat: Aquatic habitat is limited to punctuated events when the bypass floods and is temporarily inundated. Observations suggest that inundation does not last long enough to support aquatic habitat. None the less, various aquatic species might migrate through or forage in the bypass either in dry or wet conditions.

Vegetation composition: The bypass was generally devoid of vegetation during field reconnaissance in November 2008. In previous site visits, extensive thicket of blackberry with occasional willows covered major sections of the bypass.

Riparian corridor and canopy closure: none

Listed species with potential to occur: The bypass does not currently contain suitable habitat for listed aquatic species.

(c) Lower Nathanson Bypass, looking downstream. Notice the recent vegetation management, with the clearing of larger willows (see stump in the foreground) (Nov 2008).

(d) From the bottom of the Nathanson Cr. Bypass looking upstream. Earthen berm on the left of the photo, to the left of this berm is the mainstem of Nathanson Creek. Also notice that the x-section of the bypass narrows significantly and grade increases significantly at the outlet where flows are returned to the mainstem (Nov 2008).

MANAGEMENT CONSIDERATIONS AND OPPORTUNITIES

The Nathanson Cr Bypass requires periodic vegetation maintenance, as was conducted in 2008. In addition, since the bypass functions as a slack water environment during flooding, significant sediment deposition occurs. Depending on impacts to capacity, SCWA will need to remove sediment periodically.