Historical Ecology of Alameda Creek: recent findings

Alameda Creek Watershed Council
October 28, 2010

Robin Grossinger
San Francisco Estuary Institute
Steps in the Alameda Creek Historical Ecology study

Collection
**Complete**
- over 400 textual docs collected
- over 1500 PLS points collected
- over 500 photographs collected
- 20 source institutions visited

Compilation
**Complete**
- compiled text from 400 documents
- orthorectified 200+ air photos
- georeferenced 100+ historical map
- compiled on 5 basemaps

Synthesis
**In progress**
- synthesized 4 out of 5 basemaps
- created geodatabase of historical vegetation and channels

Analysis
**In progress**
- provided interim data to team
- used historical data to inform levee design

Reporting
**In progress**
- preliminary report notes
Two Goals for Today’s Talk

- Begin developing big-picture framework for watershed vision
- Start sharing information about particular places of interest
Functional reaches

- Heterogeneous in structure and function
  \( \leftrightarrow \text{not all reaches are equal} \)

- Understand changes at the reach-scale

- Reach as management-level unit
Study area boundary

- Fremont
- Sunol
- Pleasanton
- Livermore
HYDROLOGY
(dry-season flow, groundwater interaction)

GEOMORPHOLOGY
(channel form)

RIPARIAN HABITAT TYPE

- groundwater flux
- sediment dynamics
- habitat for key species
- flood protection
## Tidal Marsh Reach

<table>
<thead>
<tr>
<th>Fine sediment storage/marsh maintenance</th>
<th>1800</th>
<th>2010</th>
<th>2050</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fish support</td>
<td>○</td>
<td>.</td>
<td>?</td>
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</table>

- ○: Increase
- .: Decrease
- ?: Unclear
NILES CONE
- Highly connected tidal channel network
- Saline-brackish-fresh transition
- Connection to lowland wetlands, artesian area
- Transition to natural levees with tree cover

- Perennial flow
- Spread across flood plain in winter flood flows
- A few distinct ephemeral overflow channels
- Well-defined riparian cover

- Intermittent
- Deep persistent pools with “living water”
- Braided channel, coarse substrate

- Perennial flow
- Braided channel, coarse substrate
- Willows and sycamores
Summer Flow in Alameda Creek
ca. 1860-1875

- Alvarado
- Union City
- Niles
- ~Decoto Road
- Centerville
- ~BART crossing
Always a good watering place for stock
Generally water in early summer
Some years seems to dry
Dry a part of season
No water below in Aug/Sept

running water
“excessively deep” hole

Always flows throughout summer
Always flowing under bridge
Would always have to drive through water

Thompson and West 1878
Beginning of dry spot
Water disappeared
Spread out on sand flat
Never summer water
Water sinks away

Stream reappears
Carries water steady nearly all season

Frequently dry
Ran very little
Alternately coming up and out of sight
About half stream visible
Ceased running around August

Thompson and West 1878
Water starts running again
Runs to Alvarado
Always water

Running water every fall
Flowing even when dry above Bell Ranch bridge

Water reappeared
Water has always flowed

Water starts running again
Runs to Alvarado
Always water

Thompson and West 1878
October 22, 1795: “Following the arroyo farther down, we saw where the water disappears, perhaps a quarter of a league from the hills. At a distance of a league the water comes out again.”

(Danti 1795)
Pools in Alameda Creek
ca. 1860-1875

4-6 feet deep
Always sure of finding water
Swim until July/Aug

6-10 feet deep
Standing, not running water
"swimming in there at any time in the summer"

8-15 feet deep
Always had water except very dry years

Excessively deep hole
10-15 feet deep
"living water in it"

6-10 feet deep
"swimming all summer long"

Thompson and West 1878
March 31, 1776: “About half way on the road we came to an arroyo with little water, most of it in very deep pools…”

1889: “As the water recedes from the Alameda creek at Niles, pools are left in various places from which a number of fine specimens of the salmon trout have been taken, some of them measuring two feet or more in length.”

Daily Alta California, February 4, 1889
“...the visible gravel bed in Alameda Creek does not reach quite to the Bell Ranch Bridge”

Schussler 1901, Clough Case
“Here it is thickest with timber of many large cottonwoods, sycamores, and small willows.”

Sal 1795
1776 (March 31): “About half way on the road we came to an arroyo with little water, most of it in very deep pools. It has on its banks many sycamores, cottonwoods, and some live oaks and other trees, and it appears to flow west to empty into the estuary, toward which all the arroyos flow and toward which runs a thick growth of trees; but I was not able to distinguish whether it marked the course of the river or was a stretch of grove…”

Font 1776

1887: “The Alameda Creek was, between 1850 and 1853, the dividing line between Contra Costa County and Santa Clara County. Its banks being bordered, then as now, with cottonwood and willow trees, in the midst of an otherwise scarcely wooded plain…”

Office of State Bureau of Labor Statistics 1887
Crandall Slough, looking NE from Fremont Blvd.
1/4/1916 (SFPUC)
## NILES CONE

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<td>Groundwater recharge</td>
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<td>Fisheries support</td>
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<tr>
<td>Sediment storage</td>
<td>on fan</td>
<td>in channel</td>
<td>?</td>
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<tr>
<td>Floodplain</td>
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Perennial
(USGS 1906)

Intermittent
(USGS 1906)
Intermittent
(USGS 1906)
"Bank of a creek from the mountains SE which has changed its bed from time to time until it has cut and deposited a width of 50 rods [825 ft] or more. No water running in it at this time."

(Howe Oct 1851)

"Leave the bed of the creek (its ordinary channel is about 75 links [50 ft] wide) and rise on abrupt bank 20 feet high."

(Howe Oct 1851) [moving S]

"...in the bed or deposits of creek, which runs N. 44.25W..."

(Howe Oct 1851) [moving W]
## SUNOL VALLEY

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<tr>
<td>Fish rearing</td>
<td>🌘</td>
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<tr>
<td>Sycamore alluvial woodland</td>
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<td>Floodplain</td>
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PLEASANTON MARSH
and
ARROYO DE LA LAGUNA
[Map removed to respect permissions.]
Pleasanton Sports and Recreation Park
1911: “In recent years the marsh has been drained by the construction of reclamation ditches and by the deepening and clearing of a portion of the Laguna Creek channel, which allowed the flood waters a free course. The channel, now less obstructed, is greatly cut down…”

(Williams 1912)
**PLEASANTON LAGOON and ARROYO DE LA LAGUNA**

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<td>Sediment storage</td>
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<td>Sediment source</td>
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Next Steps

- Finish synthesis and GIS
- Develop analysis and reporting
- Translate information through presentation/communication
Sponsors

- San Francisco Public Utilities Commission (SFPUC)
- Alameda County Flood Control and Water Conservation District (ACFCWCD)

Partners

- Alameda County Resource Conservation District (ACRCD)
- Laurel Collins (Watershed Sciences)
- Rob Leidy (EPA)
THANK YOU

Robin Grossinger – robin@sfei.org
Ruth Askevold– ruth@sfei.org
Bronwen Stanford– bronwen@sfei.org

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