

**San Diego Creek Watershed Causal Assessment Project**  
**Interactive Workshop #1**  
**SCCWRP**  
**February 3, 2015; 9-1:30 PM**

**Meeting Notes**

1. Greetings/Introductions: The list of people who attended the meeting is available at the end of these notes.
2. David Gillett (SCCWRP) briefly reviewed the outcomes of the last meeting, including, the spatial and temporal constraints, biological endpoints, and the draft list of candidate causes.

The presentation for this workshop can be downloaded from the Regional Board website:  
[http://www.waterboards.ca.gov/santaana/water\\_issues/programs/planning/causal\\_assessment.shtml](http://www.waterboards.ca.gov/santaana/water_issues/programs/planning/causal_assessment.shtml)

3. The first half of the morning workshop was devoted to finalizing the details for the case definition.

Notes:

- Why: low IBI and CSCI scores (and therefore thought to not be meeting beneficial uses)
- Where: SDC –btw Jeffrey and Culver –soft bottomed substrate
- When: 2006-2013 ? Can we use all these data together?
- David reviewed the Excel spreadsheet of data that he sent out showing the six samples from four different sites and the results from a multivariate analysis
  - CADDIS suggests 1 site and 1 point per time –however, we have large amount of data, which may allow us to get a better handle on the true variance of biology –use multi samples within reach and multi years
  - Outliers in biology? Ex. Appearance of mudsnails –drastically alter community structure; fire/mudslides; more/less rainfall
  - Ex. Santa Clara case –multi year study
  - cursory look at data – rainfall, community structure (species richness/diversity), -We will start with this today
  - Multivariate community analyses allow one to look at what’s driving biological data –how data changes over time (spatial/temporal) –what’s driving population; how closely stations related to each other (dissimilar/similar) Ex. PCA, nMDS, EOF are examples of multivariate ordination techniques–contrast is univariate community measures (Shannon-Weiner diversity, species richness, species dominance, etc)
  - Multivariate approach –pay attention to every species name; how similar; specialized software: Primer, R-Vegan, PC-ORD
  - Start w/univariate measures (species richness) as a relatively easy place to start; these data are sub-samples OTUs (Operational Taxonomic Units) – 400 randomly subsampled individuals with names adjusted for index analysis

*The following 5 points are from when we sidetracked into a discussion on the nature of bioassessment and SWAMP protocols*

- Karin – IBI – randomization process to get taxa list down to 500; from 600 – 500 are identified by taxonomist; subsample and then monte carlo (pull out 400 for 20 times) to bring down to 500; For bioassessment purposes, one doesn’t need to know exact number of individuals in a stream, only their relative abundance
- Much of ecological theory would suggest that dominant organisms reflect the condition of your system
- Bob: Do streams have same abundance/diversity?
  - Reply: We can’t comment on abundance, but they likely have similar diversity (wouldn’t expect identical values, as discussed above)
- If lose 1 animal not going to make a difference to IBI, CSCI

- All organisms id to SAFIT (Southern California Association of Freshwater Invertebrate Taxonomists) Level 2; older data used different id (ex. Chironomids – id to family level; new tools chironomids to subfamily (Level 1A (Level 1.5) – older data (pre 2008) chironomids not id'd down to subfamily

*Back to the Excel spreadsheet discussion-the group reviewed the data and calculated the taxa for each site*

- Taxon column –species for sample (site 180) = 16 taxa (CountA (range for sample) function in Excel) – taxa richness
- Site 418 (2009-rep 1) = 18 taxa
- Site 418 (2009- rep2) = 12 taxa
- Site 418 (2011) = 20 taxa
- Diversity – a combination of species richness and relative dominance of taxa
- Recommendations –CA guidance recommends that you need someone w/biological skills to help with the causal assessment– helpful to identify what kind of data you need for initial analyses
- Looking for outliers of 6 samples (visual cues are (in David's opinion) more useful than a statistical test per se)
- The group reviewed the graphs and found no outliers; looking at data to determine if we can use all the data –are they similar; if all sites were different then CA based only on 1 test site
- nMDS (non metric multi dimensional scaling plots) – the analyses are run 100 different times – trying to find biggest differences; comparing community of 1 sample w/another; relative similarity/dissimilarity w/ 1 another
- because dots (samples) are evenly distributed across ordination space, it implies that the samples are not the same but not drastically different from each another (no real outliers in group; can integrate them together)

**Given the biology data we have, we can use the data from all the sites across all the years as part of our case**

The group briefly reviewed the biological endpoints that were selected during the first workshop:CSCI, O/E taxa, pMMI metrics, water, algal index, and algal metrics

David discussed how SCCWRP will approach the comparator sites

- traditionally –upstream vs. downstream; SDC – largely NPS; not going to get enough info if use traditional approach
- Natural profile of this reach of SDC? – PCA of sites based upon natural gradients; we'll take our test sites (4 sites / 6 samples) where do they fall upon on this plot?
- PCA plot – 15-20 variables; 2 axes (biggest explainers) – no biology –only natural gradients –that have been shown to influence the community of the stream
- Based on natural gradients what are the similar streams? From this pool of similar sites, we can pull out our comparator sites (this approach to obtaining comparator sites is new and outside of CADDIS)
- Pull a group of similar sites – from those sites –select them based on condition (an array of comparator sites that go along a gradient of condition)
- Comparator sites – to do ordination plot we need GIS data (we have these data for the test sites, SMC and PSA sites); do we want to include targeted sites within the watershed (IRWD, Orange County) –hard bottoms, soft bottoms, channelized? If so, then we need appropriate GIS info (lat/longs, delineate watersheds)
- David will come up with a list of comparator sites

4. The second-half of the morning was devoted to finalizing the list of Candidate Causes

- The group came up with a list of 9 stressors that could potentially cause impaired biology at the conclusion of the first workshop in Dec. 2014
- What data do we need?
  - For each cc –build a conceptual model – sources, proximate stressors

- For each cc –populate proximate stressors –what data do we have that will address those? Sets up data needs

The group initially went over each candidate cause, but was instructed to narrow down the list of nine to a more manageable six. David Gillett will prepare a more formal version of the candidate causes and send out to the group.

### 1)Channel engineering

- Channel engineering –go back and do a stressor checklist for channel engineering checklist (review GIS and hydromod (would require a field visit)?
- What is actually impacting bugs?
- Loss of habitat –riffles, boulders =(loss of streambed complexity) –loss of places to hide/hang on), instability, excessive erosion/sedimentation (burial of fauna); canopy cover (increased temperature (have this as its own cause) –increased algae-less debris); CPOM (bits of organic detritus –what animals eat); change food input change who can be supported (alteration of available food); biofilms and interactions w/BMIs?; general chem altered (change underlying chem w/in channel due to channelization) (also have conductivity as a separate cause)  
(limit to physical alterations that occur during channel engineering); other candidate causes called out separately
- Comment: Doug – other source beside gw
- Low flow (moved from flow candidate cause)
- Episodic flows (moved from flow candidate cause)

### 2)Temperature – how does temp affect bugs?

- Look at comparator sites to determine best range of temp for the stream; taxa list-are there any Cold water species?
- Low dissolved oxygen (what are we interested in -overall DO #; freq. of hypoxia; amt of algae and periphyton)
- Elevated temperature (ties into temp on bugs)

### 3)Conductivity

- Elevated conductivity -decrease in intolerant species (creates an ionic imbalance; elevated ionic strength of water kills the bugs) is the conductivity higher than comparator sites
  - Increased ions (have these data)
  - Increased TDS (have these data)
  - Have to make a decision about quality of data sets (more data but downstream of test site- do we have other data available to us –tributary –Agua Chinon (regular water quality monitoring); coastkeeper data; dry weather outfall data (collected max 5x over summer) (none w/in our test site); well data (outside of Swamp of Frogs); IRWD (Woodbridge NTS site) –

*Karin brought up the need for some sort of data review and an assessment on the quality of the data due to the number of different sources of data and different programs that collected the data. A brief discussion ensued about data quality and that perhaps the keepers of the data should have a basic knowledge of the quality of their data and then the group was steered back to discussing the remainder of the candidate causes.*

### 4)Sediment Accumulation

- Burial of fauna –(data -% fines and fines-pHAB)
- Loss of complex habitat (data –pebble count data –PHAB; habitat complexity score –PHAB)  
Data –species profiles of biota and flora
  - Freq. maintenance PCW; not freq. this particular stretch of SDC; usu. remove vegetation; level of sediment accumulation to impact capacity –very high

- Strawberry fields (very high sediment runoff due to excessive watering (sometimes 24 hrs/day)- Lake Forest Drive (Irvine Auto Center) –upstream of our test site

*5)Channel Operation/Maintenance (we discussed this candidate cause and felt that the mowing was addressed under sediment accumulation and the vector control issues could be addressed under the pesticide candidate cause) –we can delete this candidate cause*

- Vector control (pesticides –operation?) –carry out their own activities on their own; OC doesn't know when/where they perform their activities –don't inform OC – Karin –if looking at bugs, should really look at this –where are they spraying? This information can be obtained. –this information can be moved to pesticides candidate cause
- OC -herbicide (mainly for maintenance road to prevent weeds) or algicide (public complaints)
- Mechanical maintenance –heavy equipment, excavator, Michelson and 405 – BOS – emergency situation –; our test site stretch of SDC no maintenance –can query the database to double-check (mowing/etc. –is captured under sediment accumulation
- Might not be too much to this candidate cause

*6)Habitat simplification – captured under sediment accumulation and channel engineering/maintenance – got rid of this potential candidate cause*

*7)pesticides –aspects that will affect bugs*

- Operational types of pesticides (water and sediment bound pyrethroids-based on data that were available – previous test case)
- County – pyrethroids (SMC); coastkeeper dataset maybe; mass emissions data (downstream); CalDPR (OC reported in ROWD –increasing trend of application of pyrethroids)
- Salinas Case –had application data and no in stream wq data
- Pyrethroids
- OPP (very little detection in wet weather of these – phased out in 2005; strawberry growers could still use); CalDPR –know what apply to each field -query

*8)Nutrients*

- Elevated N and P (SMC collects these)
- Excessive algal mats -Chla and AFDM (how does AFDM affect BMIs?) (highly variable)

*9)Flow (moved candidate cause to channel engineering/physical alteration)*

- Reduced or elevated flow or variable flow???
- Flow –move to channel engineering??
- Constrain to dry weather
- Flow measurements taken during phab –not good –wouldn't use
- Flow data at Culver –downstream of Culver –logged every 5 minutes
- Want pools, riffles, glides –more diversity w/in creek more bugs (an interesting exercise)
- High stream velocity
- Low stream velocity
- Episodic flows
- 2007- fire suppression –plastic manufacturer – millions of gallons flowing through creek –post-event monitoring (toxicity, chemistry)
- SSOs
- Strawberry fields

- Permitted non-storm water discharges

5. The group discussed how to move forward and who would be responsible for certain tasks as shown below.

Terri Reeder –committed to a technical review of the case narrative

OC –resources toward developing the case narrative

David Gillett -will detail how comparator sites were generated

SCCWRP/RWQCB -put out a Doodle poll to determine who is willing to participate

How to deal with data exchange?

OC – cloud based like drop box; data portal w/in GIS

Data inventory

Amanda –O and M – mowing

OC –vector control

Doug -Coastkeeper

**Table 1. List of participants**

<b>FirstName</b>	<b>LastName</b>	<b>Organization</b>
Amanda	Carr	City of Irvine
Bob	Stein	City of Newport Beach
Christina	Stege	OC Public Works
David	Gillett	SCCWRP
Devin	Slaven	City of Lake Forest
Doug	Shibberu	RWQCB 8
Grant	Sharp	OC Public Works
Heather	Boyd	RWQCB 8
Jonathan	Humphrey	OC Public Works
Justin	Grewal	OC Public Works
Karin	Patrick	Aquatic Bioassay
Ken	Schiff	SCCWRP
Rebecca	Andrews	Lake Forest
Rita	Abellar	OC Public Works
Stuart	Goong	OC Public Works
Terri	Reeder	RWQCB 8
Wanda	Cross	RWQCB 8