

INLAND EMPIRE WATERKEEPER®
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SNAPSHOT DAY, 2008

Supported by: Mr. Krick and students from La Sierra High School

Ms. Hampton, Mr. Pitruzzello and students from King High School

May 10, 2008



What is “Snapshot Day”?

In honor of Water Awareness Month, citizen water monitors located all over the country take samples of local creeks each May and compare results from previous years to “snapshot” the water quality. In May of 2006, Inland Empire Waterkeeper facilitated a Snapshot Day event where 16 sites were sampled. We repeated many of those same sites this year on May 10, 2008 with the help of two groups of high school students from La Sierra High School (LSHS - Alvord Unified School District) and King High School (KHS - Riverside Unified School District). Water was found flowing at all locations; no accidents occurred and all returned by noon. Teams noted the abundance of trash and green algae along the shores and within the creeks – signs of public neglect and disregard for potentially beautiful waterways. Teams also noted the many birds, bugs, beetles, and lizards that lived among the algae and trash.

Where did you go?

Led by Mr. John Krick, a science teacher at LSHS and assisted by Waterkeeper Staffer Autumn DeWoody, five LSHS students sampled the biological, chemical and physical health of three major tributaries to Reach 3 of the Santa Ana River at, (1) Cajalco Road bridge and Temescal Creek in Corona, (2) Lincoln Street bridge and Temescal Creek in Corona, (3) Chino Creek and Pine Avenue in Chino, and (4) Mill Creek (Cucamonga Creek) and Chino Corona Road in Chino.

Jointly led by Ms. Michele Hampton and Mr. Trey Pitruzzello, both science teachers at KHS and assisted by Waterkeeper volunteer Catrina Paez, eleven KHS students sampled three highly modified creeks and arroyos in the City of Riverside at, (1) Sycamore Creek in Castleview Park, (2) Sycamore Creek in Andulka Park, (3) Alessandro Arroyo at Corinthian Way and Berry Way, and (4) Gage Canal at Washington Street between Dufferin and Bradley.

What did you sample for?

Each team measured the following using a combination of kits and meters:

- Air temperature
- Water temperature
- Dissolved oxygen
- Phosphate
- Nitrate-Nitrogen
- Ammonia-Nitrogen
- pH
- conductivity



What did you find?

To determine the regulatory benchmarks by which to compare our results, we must first identify *beneficial uses* from the Basin Plan.

SITE	IDENTIFIER	BENEFICIAL USES
Temescal Creek/Cajalco Rd.	Reach 2 of Temescal Creek	Intermittent ¹ AGR, IND, GWR, REC1, REC2, LWRM. Excepted from MUN ²
Temescal Creek/Lincoln St.	Reach 1 of Temescal Creek	REC1, REC2, LWRM, WILD. Excepted from MUN ²
Chino Creek/Pine Ave.	Reach 1B of Chino Creek	REC1, REC2, WARM, WILD, RARE. Excepted from MUN ²
Mill Creek/Chino Corona Rd	Mill Creek (Prado Area)	REC1, REC2, WARM, WILD, RARE. Excepted from MUN ²
Sycamore Creek/Castleview Park	Sycamore Creek (Tequesquite Arroyo)	GWR, REC1, REC2, WARM, WILD, SPWN. Excepted from MUN ²
Sycamore Creek/Andulka Park	Sycamore Creek (Tequesquite Arroyo)	GWR, REC1, REC2, WARM, WILD, SPWN. Excepted from MUN ²
Arroyo/Corinthian Way	-	-
Canal/Dufferin	-	-

¹ “Intermittent” beneficial uses occur because the stream is ephemeral. While streams are flowing, beneficial uses are made of the water. However, with the addition of a treatment plant upstream of our site, this creek flows year-round.
² Excepted from MUN means it is not considered suitable for municipal or domestic water supply because of high TDS concentrations, natural or human contamination, insufficient production volume, carries treated wastewaters, storm water runoff, or agricultural drainage waters.

Municipal and Domestic Supply (**MUN**) waters are used for community, military, municipal or individual water supply systems. These uses may include, but are not limited to, drinking water supply.

Agricultural Supply (**AGR**) waters are used for farming, horticulture or ranching. These uses may include, but are not limited to, irrigation, stock watering, and support of vegetation for range grazing.

Industrial Service Supply (**IND**) waters are used for industrial activities that do not depend primarily on water quality. These uses may include, but are not limited to, mining, cooling water supply, hydraulic conveyance, gravel washing, fire protection and oil well repressurization.

Groundwater Recharge (**GWR**) waters are used for natural or artificial recharge of groundwater for purposes that may include, but are not limited to, future extraction, maintaining water quality or halting saltwater intrusion into freshwater aquifers.

Water Contact Recreation (**REC 1***) waters are used for recreational activities involving body contact with water where ingestion of water is reasonably possible. These uses may include, but are not limited to, swimming, wading, water-skiing, skin and scuba diving, surfing, whitewater activities, fishing and use of natural hot springs.

Non-contact Water Recreation (**REC 2***) waters are used for recreational activities involving proximity to water, but not normally involving body contact with water where ingestion of water would be reasonably possible. These uses may include, but are not limited to, picnicking, sunbathing, hiking, beachcombing, camping, boating, tidepool and marine life study, hunting sightseeing and aesthetic enjoyment in conjunction with the above activities.

Warm Freshwater Habitat (**WARM**) waters support warmwater ecosystems that may include, but are not limited to, preservation and enhancement of aquatic habitats, vegetation, fish and wildlife, including invertebrates.

Limited Warm Freshwater Habitat (**LWRM**) waters support warmwater ecosystems which are severely limited in diversity and abundance as the result of concrete-lined watercourses and low, shallow dry weather flows which result in extreme temperature, pH, and/or dissolved oxygen conditions. Naturally reproducing finfish populations are not expected to occur in **LWRM** waters.

Wildlife Habitat (**WILD**) waters support wildlife habitats that may include, but are not limited to, the preservation and enhancement of vegetation and prey species used by waterfowl and other wildlife.

Rare, Threatened or Endangered Species (**RARE**) waters support the habitats necessary for the survival and successful maintenance of plant or animal species designated under state or federal law as rare, threatened or endangered.

Spawning, Reproduction and Development (**SPWN**) waters support high quality aquatic habitats necessary for reproduction and early development of fish and wildlife.

Team La Sierra: The results in yellow indicate values that exceed standard thresholds.

	Air Temp	Water Temp*	Dissolved Oxygen*	Phosphate	Nitrate-Nitrogen	Ammonia-Nitrogen	pH*	Electrical Conductivity*
UNITS	°C (°F)	°C (°F)	mg/L	mg/L	mg/L	mg/L	-	µS
Temescal Creek/Cajalco Rd.	17 (63)	18 (64)	8.3	< 1**	2	< 1**	7.88	1420
Temescal Creek/Lincoln St.	21 (69)	16 (61)	6.3	1	3	< 1**	7.89	1373
Chino Creek/Pine Ave.	22 (71)	23 (73)	7.4	7	3	< 1**	7.48	1110
Mill Creek/Chino Corona Road	24 (75)	24 (75)	12.4	0.8	3	< 1**	9.5	783
Results from 2006								
Temescal Wash/Cajalco	35 (95)	26 (78.8)	-	< 1**	< 5	-	9	-
Temescal Wash/Lincoln	36 (96.8)	28 (82.4)	-	2	5	-	10	-

*Indicates an average of 3 measurements.

**More data needed since test kit did not measure below 1 mg/L.

No results were obtained from San Antonio Channel or Mill Creek in 2006.

Team King: The results in yellow indicate values that exceed standard thresholds.

	Air Temp	Water Temp*	Dissolved Oxygen*	Phosphate	Nitrate-Nitrogen	Ammonia-Nitrogen	pH*	Electrical Conductivity*
UNITS	°C (°F)	°C (°F)	mg/L	mg/L	mg/L	mg/L	-	µS
Sycamore Creek/Castleview Park	-	20 (68.5)	10	0.7	1.12	0	8.65	1177
Sycamore Ck/Andulka Park	-	17.4 (63)	6	0.6	1.5	0	8.15	1320
Arroyo/Corinthian Way	-	22 (71.8)	10	0	>3**	0	8.08	847
Canal/Dufferin	-	15 (58.6)	7	0.9	0.25	0	8.3	1637
Results from 2006								
Sycamore Creek/Castleview Park	28 (82.4)	21 (69.8)	-	2	< 5	-	8	-
Sycamore Ck/Andulka Park	26.9 (81)	22 (72)	-	2	< 5	-	8	-
Arroyo/Corinthian Way	24 (75.2)	20 (68)	-	2	2.5	-	8	-

*Indicates an average of 3 measurements.

**More data needed since test kit did not measure above 3 mg/L.

No results were obtained from the canal at Dufferin in 2006.

Based on the designated *beneficial uses*, and the results we found in the field, we can compare to the appropriate thresholds, which can vary from reach to reach and creek to creek.

- **Water Temperature:** The temperature of water affects aquatic life because most species can only thrive within a strict temperature range. Other factors, such as dissolved oxygen, can be affected by the temperature, which in turn, affects the rate of photosynthesis in aquatic plants. Human intervention can change temperature by removing canopy cover and building or removing water diversions along the stream or in the stream, causing a rise in water temperature. Sites with a WARM designation should not exceed 78°F from November to July.
- **Dissolved Oxygen:** Oxygen is needed for respiration, movement, feeding, and growth. Therefore the amount of oxygen in the water affects not only the number of aquatic animals and plants, but also the amount of bacteria in the water. The concentration of dissolved oxygen in water should not be less than 5 mg/L.
- **Phosphate:** Phosphates most commonly enter the river system through lawn and garden fertilizer with run-off or soil erosion. Increased phosphate concentrations can lead to increased growth of algae and plants, which then depletes dissolved oxygen in the water. Nearly all of the sampled sites exceeded the standard limit of 0.1 mg/L.
- **Nitrate-Nitrogen:** Similar to phosphate, nitrate usually enters through the river system via fertilizer. Thus, it also promotes algae blooms and excessive aquatic plant growth that can suffocate other life. Excess levels of nitrates in drinking water can cause methemoglobinemia or “blue baby” disease. All of the sampled sites are within the acceptable level of 10 mg/L.
- **Ammonia-Nitrogen:** Excess ammonia can cause harm by accumulating to toxic levels and affecting metabolism. This toxic affect can then harm organisms higher up in the food chain. The acceptable limit of Ammonia- Nitrogen is 0.098 mg/L. The test kits used at the LSHS sites does not measure concentrations below 1 mg/L so we do not know whether the concentrations exceed threshold.
- **pH:** This is a measure of hydrogen ions that controls the acidity and the alkalinity of the water. Most aquatic life can only survive within a narrow range of pH, thus it is important to monitor. The acceptable level for pH is between 6.5 and 8.5.
- **Conductivity:** By measuring conductivity, we can estimate the amount of dissolved solids that carry an electrical charge in the water. Dissolved solids include, acids,

minerals, salts, and metals. By collecting this data we can compare it to past results and determine whether there is a sudden increase in conductivity that may be a signal to a bigger problem. The acceptable limit of conductivity for irrigation water is 700 $\mu\text{S}/\text{cm}$. We will assume this limit for waters designated AGR, or GWR, and others that we know to be used for future irrigation purposes.

Where do we go from here?

Certainly, we intend to repeat this event every May and empower local high school science clubs or classes to get “in the field” and do real water sampling at local creeks. In this way, they not only get up close and personal with the many waterways that are undervalued, hidden away and disregarded as “flood control channels” or trash dumps but they are energized about science and the job opportunities that are available for science students.

Thank You!

Thanks to the teachers, students and volunteers! See you next year! Feel free to contact Program Director, Autumn DeWoody for more information at (951) 689-6842 or Autumn@iewaterkeeper.org.

