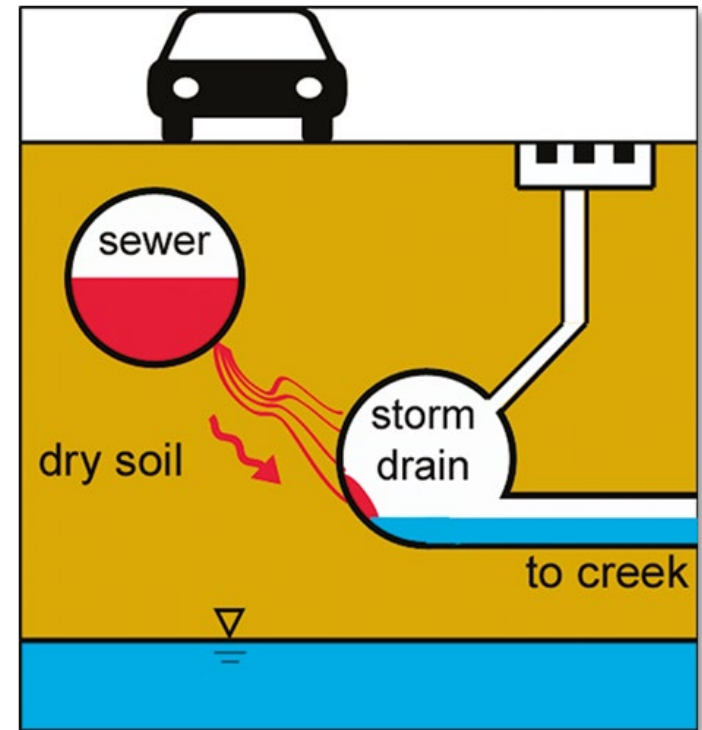


# Is an Exfiltration Enforcement Action in Your Future?

## San Diego Region “Exfiltration” Tentative Investigative Order

CASA/SCAP Exfiltration Workshop  
San Diego, October 1, 2018

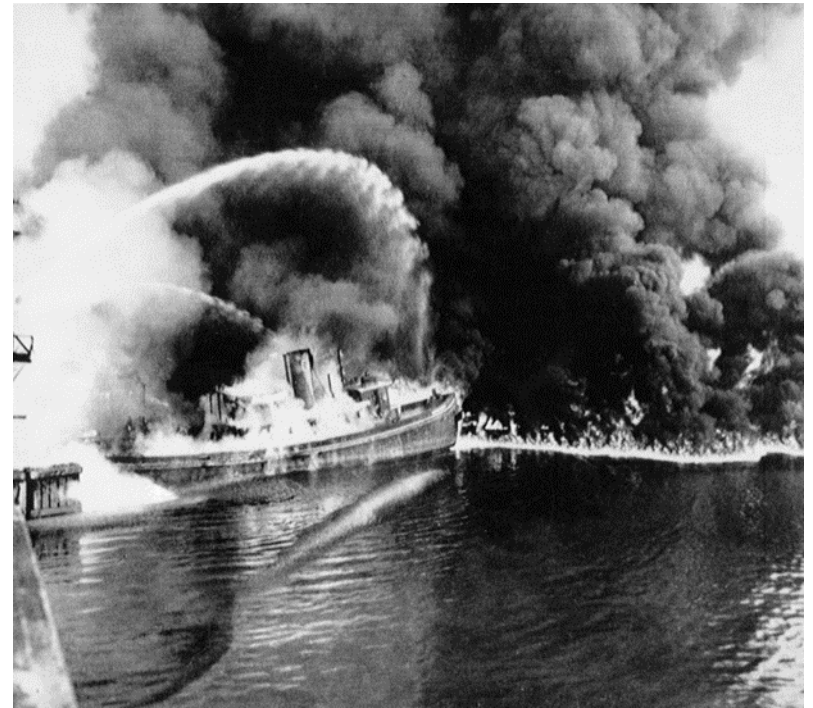
Steve Jepsen  
sjepsen@scap1.org



(Sercu et al. 2011, ES&T)

# A History of Water Quality

1. Roman Empire – 800 BC mains, 100 AD laterals
2. Industrial Revolution – 1800s
3. Porter-Cologne Act - 1969
4. Clean Water Act – 1972
5. CMOM - 1998
6. WDR – 2006 (2019)
7. MS4 – 2013 (latest version)



# What's the Problem?

- \* Water Quality from Urban Runoff continues to be an issue. Including bacteria from human sources.
- \* There are little or no direct funding sources for stormwater quality programs
- \* Senate Bill 231 – Hertzberg attempts to remedy this by including storm drain in the definition of sewer

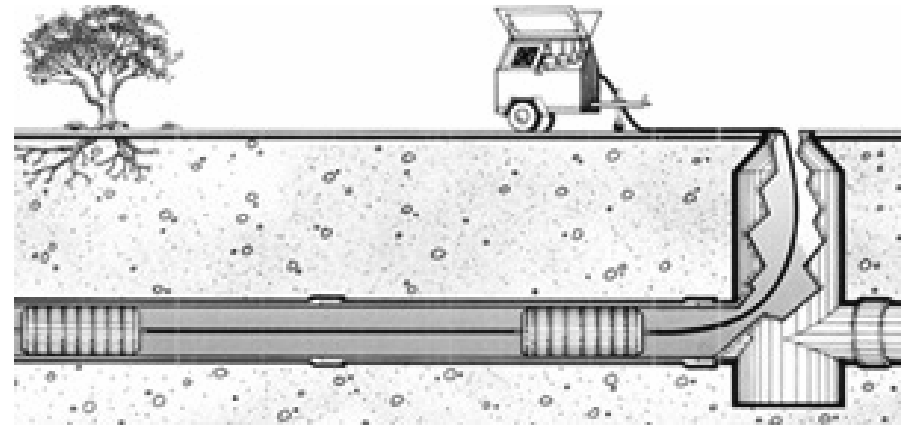


# Exfiltration Papers

- \* City of Santa Barbara - Sewage Exfiltration as a source of Storm Drain Contamination – 2011
- \* OCSD – Status Report on the Development of a Reporting Methodology for Subsurface Discharges of Sewage – 2005
- \* Institution of Civil Engineers - Distribution of sewer exfiltration to urban groundwater – 2008
- \* Southern California Coastal Water Research Project - Doheny State Beach Microbial Source Tracking Study – 2014
- \* Texas Water Resources Institute - Expansion and Evaluation of Texas' Bacterial Source Tracking Program – 2015
- \* Yiping Cao, PhD - Evaluation of molecular community analysis methods for discerning fecal sources and human waste
- \* Metcalf & Eddy – Wastewater Engineering Treatment Disposal and Reuse - 1995

# Are Sewers a Bacteria Source? No

UC Irvine, OCSD, Brown and Caldwell Study –  
 Quantifying Sub-surface discharges from Individual Sewer Defects



*Metcalf & Eddy Water Treatment Book has a chapter dedicated to how natural treatment systems, in the soil, effectively treat bacteria and viruses*

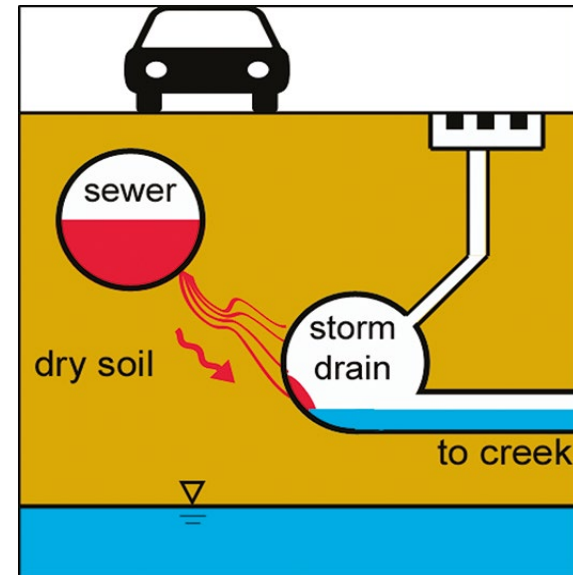
**TABLE 14-7**  
**Treatment performance of onsite system components and intermittent or recircu**

Parameter	Raw waste (1)	Septic tank effluent (2)	1.0 ft below bottom of leachfield trench (3)	3.0 ft below bottom of leachfield trench (4)
BOD <sub>5</sub> , mg/L	210–530	140–200	0	0
SS, mg/L	237–600	50–90	0	0
Nitrogen, mg/L				
Total	35–80	25–60	—	—
NH <sub>4</sub> <sup>+</sup>	7–40	20–60	20 <sup>b</sup>	—
NO <sub>3</sub> <sup>-</sup>	<1	<1	40 <sup>b</sup>	40 <sup>b</sup>
Total phosphorus, mg/L	10–27	10–30	10 <sup>b</sup>	1 <sup>b</sup>
Fecal coliforms, MPN/100 mL	10 <sup>6</sup> –10 <sup>10</sup>	10 <sup>3</sup> –10 <sup>6</sup>	20–10 <sup>2</sup>	0
Viruses, PFU/mL <sup>c</sup>	Unknown	10 <sup>5</sup> –10 <sup>7</sup>	20–10 <sup>3</sup>	0

# Are Sewers a Bacteria Source? Yes

## \* City of Santa Barbara Studies

- Bacteria found in storm drains
- Dogs used to identify sources
- Human specific HF 183
- Sewers shown to be a source
- Dye tests confirm sewer exfiltration into storm drain occurring



(Sercu et al. 2011, ES&T)

# San Diego Regional Investigative Order

Tentative Investigative Order No. R9-2018-0021:

*An Investigative Order Requiring the Submittal of Technical and Monitoring Reports to Quantify the Sources and Transport Pathways of Human Fecal Material to the San Diego River Watershed.*

- The order directs agencies in the San Diego River Watershed to identify and **quantify** the sources and transport pathways of human fecal materials to the San Diego Watershed.

# Here is the Proof?



The order is in response to a Surfer Health Study prepared by SCCWRP and other studies that have identified human fecal matter in the San Diego Watershed



# SCCWRP – Surfer Health Study

- \* In the winters of 2013/2014 and 2014/2015, a Surfer Health Study (SHS) was conducted by the Southern California Coastal Water Research Project (SCCWRP), at Ocean Beach and Tourmaline Beach.
- \* The study measured illness rates of surfers after ocean exposure.
- \* Results indicated an increased rate of GI illness following ocean exposure compared with not entering the water (25 illnesses/1000 swimmers, vs. 18 illnesses/1000 swimmers). This illness rate increased even further following wet weather (up to 30 illnesses/1000 swimmers).
- \* USEPA criteria for recreational waters is 32-36 illnesses/1000 swimmers.

# The Exfiltration Order Problems

- \* Justification for the Investigative order is the 5 GI illness increase out of 1000 during a wet weather event
- \* During wet weather, higher FIBs doesn't make sense for exfiltration
- \* Natural treatment in soil
- \* Lack of nexus between the entities named in the order and their relative contribution to the problem
- \* SCCRP cost benefit analysis does not support the approach taken by the Order
- \* Water Code sections 13267(b) and 13255(c) - burden of compliance must bear a reasonable relationship to the need and benefits of the order

# The Exfiltration Order

## Foot Note in the Order:

3 Exfiltration refers to the migration of wastewater from the sanitary sewer collection system to the surrounding environment through joints or breaks in the collection system or through the material making up the system itself (e.g. vitrified clay pipe (VCP)). Exfiltration may be related to construction practices, infrastructure deterioration, inadequate preventive maintenance programs, or insufficient planned system rehabilitation or replacement programs which have resulted in deteriorated pipes, manholes, and pump stations that allow sewage containing high levels of suspended solids, pathogenic organisms, toxic pollutants, nutrients, oil, and grease to exit the systems and contaminate adjacent ground and surface waters, and/or enter the storm drain.

## Repeated in the Order:

a. *Exfiltration* - The (agency name here) has not provided the San Diego Water Board with any estimation regarding the exfiltration of wastewater from the sanitary sewer collection system to the San Diego River Watershed.

# The Exfiltration Order Requires

Agencies in the watershed must:

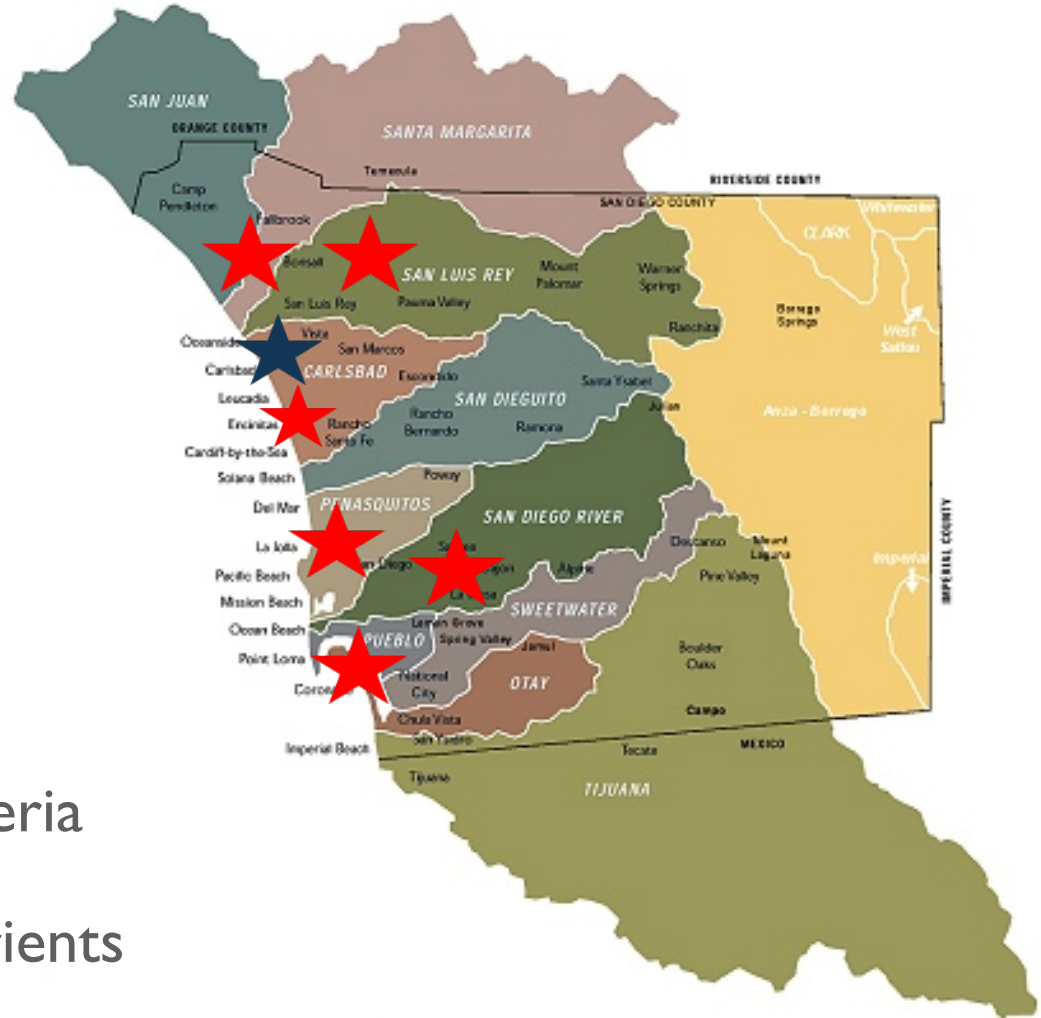
- \* Identify and quantify relative contributions of suspected sources of human fecal material in wet weather discharges to the San Diego River
- \* Determine the transport pathways of such discharges
- \* Determine how this information will be used by each Discharger to assess the effectiveness of current management measures in preventing discharges of human fecal matter into the San Diego River, its tributaries, and the downstream beach coastal waters

# The Exfiltration Order Response

What are we doing about it:

- \* CASA and SCAP prepared a joint comment letter with assistance from Downey Brand
- \* Organizing workshops:
  - \* 1 – internal to share knowledge and identify research areas - today
  - \* 2 – with CASQA and stormwater community?
  - \* 3 – for the regulators and scientists (and NGOs?) to educate them on the basics of collection system operation and sewage treatment in soil?
- \* Reaching out to SCCRP to offer assistance with collection system understanding

# But There's More



- ★ Priority = Bacteria
- ★ Priority = Nutrients

# And More

- **WQIP Strategies**
  - Page 557 of 1,368

ID	Strategy	Implementation Approach (Frequency of Inspections, B.3.b.(1)(a)(iv)) (Funds/Resources, B.3.b.(1)(b)(iv), B.3.b.(3)(a)(iii)) (Triggers, B.3.b.(1)(b)(v)) (Inventory BMPs, B.3.b.(1)(a)(ii))	Jurisdictional (B.3.b.(1)(a)) or Optional (B.3.b.(1)(b))	Implementation or Construction Year (B.3.b.(3)(a)(i); B.3.b.(3)(a)(ii))	Implementation Schedule (B.3.b.(3)(a)(iv))	Pollutants Addressed						Source (B.3.b.(1)(a)(i))	Responsible City Department and Other Collaborating Departments or Agencies (B.3.b.(1)(c))
						Bacteria	Nutrients	Metals	Trash	Sediment	Flow		
<b>MS4 Infrastructure</b>													
DAM-12	Implementation of operation and maintenance activities (inspection and cleaning) for MS4 and related structures (catch basins, storm drain inlets, detention basins, etc.).	Refer to JRMP Section 7. The MS4 inventory is inspected by Public Works staff at least once per year. Based on the findings of the inspections, the City performs required cleanings and proper disposal of collected material. Removal of the collected trash and debris prevents the materials from being pushed through the system and into the receiving waters from runoff	Jurisdictional	FY16	Continuous-Ongoing	X		X	X	X		MS4	Public Works and Clean Water Program
DM-12.1	Perform catch basin cleaning	Inspect and clean catch basins annually	Jurisdictional	FY16	Continuous-Ongoing	X	X	X		X		MS4	Public Works and Clean Water Program
DM-12.2	Repair and replace MS4 components as needed to provide source control from MS4 infrastructure.	In order to limit inflow of pollutants and reduce pollutant loads, the City will take proactive measures to improve, repair, and replace MS4 components.	Jurisdictional	FY16	Continuous-Ongoing	X	X	X		X		MS4	Public Works and Clean Water Program
DM-13	Implement controls to prevent infiltration of sewage into the MS4 from leaking sanitary sewers and identify sewer leaks and areas for sewer pipe replacement.	Refer to JRMP Section 4.7 and the City's Sanitary Sewer Management Plan. The conducts a variety of activities to effectively operate, maintain, repair and replace sewer mains, manholes, and pump stations.	Jurisdictional	FY15	Continuous - Ongoing	X						MS4	Public Works and Clean Water Program

“Implement controls to prevent infiltration of sewage into the MS4 from leaking sanitary sewers and identify sewer leaks and areas for sewer pipe replacement.”

# And Still More

## LA River eWMP Strategies

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#	WCM Category/ID	WCM	BMP effectiveness with respect to WQPs					Agency								
			Category I	Category II	Category III	Sediment reduction	Volume or flow reduction	Downey	Flood Control	Lakewood	Long Beach	Lynwood	Paramount	Pico Rivera	Signal Hill	South Gate
15	MCM-PIP-1	Stormwater resources on City website	◆	◆	◆	◆	◆	X	X	X	X	X	--	X	X	X
<b>Public Agency Activities</b>																
16	MCM-PAA-1	Enhanced BMP requirements for fixed facility/field activities	◆	◆	◆	◆	◆	X	X	X	X	X	--	X	X	X
17	MCM-PAA-2	Reprioritization of catch basins and clean-out frequencies	◆	◆	◆	◆	◇	X	X	X	X	X	--	X	X	X
18	MCM-PAA-3	Integrated Pest Management Program	◆	◆	◆	◇	◇	X	X	X	X	X	--	X	X	X
19	MCM-PAA-4	Enhanced measures to control infiltration from sanitary sewers	◆	◆	◇	◇	◇	X	X	X	X	X	--	X	X	X

“Enhanced measures to control infiltration from sanitary sewers”



# Conclusions

- \* Bacteria are a frequent constituent of concern in watersheds
- \* Stormwater quality practitioners and scientists don't always understand collection systems
- \* Sewer Exfiltration/MS4 Infiltration is a prime suspect based on a lack of understanding of collection systems
- \* We need to get out in front of this issue and educate the regulators and stormwater quality practitioners



## San Diego Tentative Investigative Order R9-2018-0021

[https://www.waterboards.ca.gov/sandiego/water\\_issues/programs/san\\_diego\\_river\\_io/index.html](https://www.waterboards.ca.gov/sandiego/water_issues/programs/san_diego_river_io/index.html)

Steve Jepsen  
SCAP  
sjepsen@scap1.org  
760.479.4112

