ENVIRONMENT / HEALTH / INFRASTRUCTURE

IMPERIAL BEACH TECHNOLOGY

SUPER INTELLIGENCE SYSTEMS

PUBLIC-SOURCE RESEARCH

MAGAZINE EDITION / 02 OCT 2026

TIJUANA RIVER POLLUTION

Imperial Beach, California

History, causes, environmental damage, human and animal health, cleanup progress and realistic recovery timelines

SPECIAL REPORT

28 REVIEW SECTIONS / 46 SOURCE ENTRIES

RESEARCH CUTOFF: OCTOBER 2, 2026

IBT-SIS-TRP-2026-1002

PUBLIC-SOURCE REVIEW / EDITION NOTE

Central assessment

This is not an untouched problem and not a completed cleanup. The evidence supports a continuing binational infrastructure and exposure problem, with measurable work underway. Durable recovery requires functioning collection, treatment, maintenance, pollution controls and verified environmental results - not a single ribbon-cutting date.

Evidence review draws on U.S. and Mexican agencies, federal audit records, original scientific research, public-health assessments, local planning documents and monitoring organizations. Official project deadlines are separated from this report's conditional planning scenarios.

28
REVIEW SECTIONS

46
SOURCE ENTRIES

02 OCT 2026
ORIGINAL RESEARCH CUTOFF

Review identity & scope

Review identity. An AI-assisted public-source research report prepared under Imperial Beach Technology branding. "Super Intelligence Systems" is report branding, not a government designation, engineering license or medical credential. No independent field sampling, facility inspection or individual clinical assessment was performed.

Time-sensitive information. Construction milestones are verified to the stated research cutoff. This document does not certify the live safety of any beach, neighborhood air sample or drinking-water supply.

How to read this report

How to read the evidence. Documented means a named source reports the observation or action. **Agency target** means a planned date, not a guarantee. **Study finding** carries the study's population, period and limitations. **IBT analysis** means an explicit inference or proposed evaluation framework, not a government determination.

Numbered citations link to the source register; linked source titles open the original public documents. Related announcements are not counted as independent corroboration. Dates and units are preserved, and contradictory-looking schedules are compared by project scope.

Magazine edition. This edition changes the visual presentation, not the research cutoff or the underlying report content. The source report's qualifications, distinctions and references are retained. It is not a new verification of current conditions.

READER GUIDE

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01 / PUBLIC-SOURCE RESEARCH

Executive assessment

01

The defensible answer is neither "nothing has happened" nor "the crisis is solved."

The pollution problem connects an urban sewer network, aging pumping and conveyance systems, treatment facilities on both sides of the border, a river and estuary, and a coast that transports pollution across jurisdictional boundaries. A failure in one part can overwhelm another. The federal audit record documents infrastructure deterioration and longstanding planning and response weaknesses. [R05] [R07]

What is different now

There are operational improvements and major projects in construction. EPA's September 30, 2026 announcement reports a combined 53 million gallons per day (MGD) of treatment capacity, a 97% reduction in canyon-collector effluent, a 99% reduction in South Bay plant exceedances, and 54% lower average dry-season flows in 2025-2026 than in 2022-2024. These are agency-reported metrics with different denominators, not four measures of the same outcome. [R02]

What remains unresolved

The full 50-MGD South Bay expansion is not yet an operating completed facility. Air exposure is also not merely a question of unpleasant smell: the September 2026 federal consultation identifies short-duration hydrogen sulfide concerns at particular locations, while making narrower, more reassuring findings for longer-duration toxicological exposure in the monitored record. Neither conclusion describes every pollutant or every resident. [R01] [R16]

ANSWER TO THE CLEANUP TIMELINE QUESTION

IBT planning assessment: meaningful improvements can arrive project by project during 2026-2027; sustained system-level improvement requires further commissioning and demonstrated performance over subsequent seasons. A prudent planning window extends into 2028-2031, while habitat recovery can continue into the 2030s and maintenance never ends. These are conditional planning bands, not official promises.

No reviewed evidence establishes that permanent improvement is impossible. Equally, the documents do not justify a guaranteed date when all contamination, all beach closures and all ecological damage will disappear. The schedule, scenario and performance sections explain the scope, dependencies and tests behind that conclusion.

02 / PUBLIC-SOURCE RESEARCH

The watershed and the two pollution routes 02

A clean river channel alone would not necessarily produce clean coastal water.

The Tijuana River watershed covers roughly 1,750 square miles, with about three-quarters in Mexico and the remainder in the United States. Its drainage crosses an international boundary before reaching the estuary and Pacific Ocean near Imperial Beach. Watershed boundaries, sewer-service boundaries and government jurisdictions are not the same. [R06]

PATHWAY	HOW EXPOSURE REACHES IMPERIAL BEACH
River and canyon route	Wastewater and urban runoff enter the river or tributary canyons, pass through the border region, and affect the valley, estuary and coastal outlet. Collection and diversion structures intercept only the flows they are designed and able to handle.
Coastal route from Mexico	Discharges along the Tijuana coast, including the San Antonio de los Buenos / Punta Bandera area, can affect beaches farther north when ocean circulation transports polluted water. This is distinct from water crossing the border in the river channel.

The two-route distinction follows EPA's watershed program and technical framework. It is why both sewer-system controls and the quality and location of coastal effluent discharge matter. [R07]

What the names mean

SBIWTP is the South Bay International Wastewater Treatment Plant, a federally owned U.S.-side facility. **SAB** refers to San Antonio de los Buenos in Mexico. **PB-1** is Pump Station 1: a conveyance facility, not a substitute for treatment. The **River Gates** project concerns collection pipes and interception; the name does not describe a dam that permanently seals the international river. [R01] [R03]

A SYSTEMS INTERPRETATION

A project can reduce pollution at one crossing while leaving the coastal route active. Conversely, improved treatment south of the border can improve coastal conditions without eliminating river sediment, trash or stormwater. Both pathways must be measured rather than inferred from one plant's capacity.

03 / PUBLIC-SOURCE RESEARCH

History: why this became a recurring problem 03

The valley was altered over decades; the present crisis is not the result of one recent incident.

Archived 1934 newspaper accounts describe binational discussions of river sewage, and 1937 accounts describe construction of an international outfall sewer. These contemporaneous accounts show that sanitation intervention long predates the modern plant. They do not establish that the earlier system permanently resolved pollution. [R46]

The landscape before the modern sewer crisis

Historical-ecology research reconstructs a river valley with broad, shifting channels, seasonal water patterns, wetlands and riparian vegetation. Urban development, channel modification, agriculture and infrastructure changed that landscape. These changes affect how sediment, floodwater and contaminants now move. Historical habitat loss cannot responsibly be assigned entirely to sewage; the research evaluates multiple land-use and hydrologic drivers. [R08] [R09]

PERIOD	DOCUMENTED DEVELOPMENT	WHY IT MATTERS
1944	The U.S.-Mexico water treaty established the binational institutional framework administered through the two sections of the IBWC. [R04]	A shared boundary problem is handled through agreements and separate national institutions, not one municipal utility.
Late 1977	Construction of the Tijuana River flood-control project began. [R10]	Flood conveyance became a major engineered function of the river corridor.
1997-1999	South Bay plant construction was completed in September 1997; full operation with the outfall began in January 1999. [R10]	Significant binational treatment infrastructure existed decades before today's expansion.
2008	A revised Record of Decision selected U.S.-side activated-sludge secondary treatment. [R11]	The appropriate treatment configuration itself required evaluation, decisions and subsequent implementation.

The 2020 GAO audit later documented a mismatch between system needs and infrastructure condition, planning and response. It offers structural evidence rather than a claim about any individual official's motives. [R05]

04 / PUBLIC-SOURCE RESEARCH

History: the modern intervention period

04

A chronology of decisions is not the same as a chronology of water-quality recovery.

DATE	ACTION OR EVIDENCE	STATUS INTERPRETATION
2017	A collector collapse leads to wastewater bypasses. The later IBWC reconstruction distinguishes an approximately 28-million-gallon repair-period bypass from much larger initial estimates. [R45]	Event duration, source and measurement limits matter; initial headlines are not final accounting.
2020	GAO identifies water-quality management weaknesses. USMCA-related funding provides $300 million through EPA. [R04] [R05]	Audit and investment framework; not a cleanup completion.
2022	The two countries announce a $474 million investment framework linked to Minute 328. [R12]	Multiple projects and projected benefits, not a promise to eliminate every pollution source.
2024	South Bay rehabilitation and expansion contract begins; household surveys measure community impacts. [R13] [R25]	Engineering work and health assessment proceed on separate tracks.
2025	Mexico reports completion of San Antonio de los Buenos; South Bay interim expansion is completed; Minute 333 adds further commitments. [R15] [R01] [R14]	Real improvements, with additional collection, maintenance and planning still needed.
2026	New molecular water/air research, a federal hydrogen sulfide consultation and continued major construction are reported. [R23] [R17] [R01]	Evidence of exposure and construction progress coexist; one does not invalidate the other.

How earlier promises should be read

The 2022 package projected fewer transboundary-flow days and less untreated coastal discharge, not elimination of every flow or closure. Compare those dated promises with delivered scope and operating outcomes. [R12]

IBT analytical rule: Track authorization, funding, contract award, construction, commissioning and compliant operation as separate milestones. Collapsing them into the word "done" creates misleading public expectations and makes accountability harder.

05 / PUBLIC-SOURCE RESEARCH

Causes: a connected infrastructure failure

05

Pollution is produced by several interacting mechanisms rather than a single broken pipe.

MECHANISM	CONSEQUENCE	WHAT WOULD INTERRUPT IT
Insufficient or failing collection	Wastewater escapes before it reaches a functioning treatment plant.	Reliable sewers, interceptors, connections and rapid repair.
Pump, power or pipe failures	An upstream failure can force rerouting, overflow or interruption elsewhere.	Redundancy, spare equipment, backup power and coordinated operating rules.
Treatment limitations	A plant can receive more water or more difficult influent than its processes can consistently handle.	Adequate process capacity, pretreatment, solids handling and verified effluent quality.
Storm runoff, sediment and debris	High flows carry pollutants, clog infrastructure and strain hydraulic capacity.	Runoff controls, trash capture, sediment management and protected flood conveyance.
Underfunded upkeep and growth	A completed asset deteriorates or becomes too small for future demand.	Lifecycle funding, staffing, preventive maintenance and updated demand forecasts.

The failure mechanisms above synthesize the GAO audit, the South Bay project scope and Minute 333's emphasis on maintenance, monitoring and future infrastructure needs. They are not findings that every component is failing at the same time. [R05] [R13] [R14]

What is and is not established about responsibility

The system receives both domestic and industrial wastewater. Coastkeeper's 2025 sampling program reports bacterial contamination and chemical detections at river and canyon sites. That supports investigation and source control; it does not, by itself, identify a particular factory as the cause of a resident's illness or establish that one named operator caused every discharge. [R03] [R35]

The maintenance trap - IBT inference: Construction spending does not ensure reliable operation. Ask who must maintain the asset, with what operating funds, spare parts and public performance record.

06 / PUBLIC-SOURCE RESEARCH

Pollutants: what is in the problem

06

Sewage is a mixture. A test for one indicator does not characterize every hazard.

COMPONENT	RELEVANT DAMAGE OR EXPOSURE	EVIDENCE LIMIT
Fecal contamination and enteric microorganisms	Ingestion, contaminated hands, wound contact and other water-contact pathways can produce illness. [R28]	Indicator bacteria measure contamination risk; a positive indicator is not a diagnosis.
Organic matter and nutrients	Oxygen demand and altered estuarine conditions can stress aquatic life. [R24]	Effects vary with residence time, mixing and biological conditions.
Hydrogen sulfide and other gases	Gas release can affect nearby air; short peaks, odors and irritation require separate assessment. [R19] [R20]	One gas monitor cannot measure every chemical or biological agent.
Waterborne material in aerosols	Molecular and chemical evidence demonstrates movement of sewage-associated material into air. [R21] [R23]	Genetic detection is not equivalent to infectious dose or an observed infection.
Trash, sediment and debris	Physical habitat degradation, obstruction and maintenance burdens. [R08] [R14]	Removing visible litter does not remove dissolved pollutants or reliably disinfect water.
Industrial and other chemical inputs	Some monitoring detects metals and other chemicals, warranting source-specific assessment. [R35]	Detection alone is not proof of a harmful dose, a specific emitter or an attributable disease.

IBT interpretation: A "clean" result should always identify the substance tested, method, detection limit, location, time and applicable benchmark. A sample can comply for one parameter while remaining unsuitable for a different use. Conversely, a detected substance can be below a health-based threshold; presence and risk are not interchangeable.

07 / PUBLIC-SOURCE RESEARCH

Why weather and flow change the outcome

07

Dry-season progress is important, but it is not a complete test of system resilience.

Dry-weather contamination and wet-weather overload

Research in the estuary connects wastewater-related fluorescence signals with polluted flows and documents hypoxia and stratification under particular conditions. Persistent low-flow contamination can therefore matter even without a major storm. Rain adds a different challenge: changing flow, sediment and mixing conditions can alter pollutant delivery and sensor interpretation. [R24]

At the other extreme, the regulator documented South Bay receiving more than 45 MGD for 13 hours and peaks above 60 MGD for nine hours during a May 2026 pipeline-collapse event. This illustrates an actual hydraulic stress, not a hypothetical design concern. [R03]

Three quantities that must not be confused

MEASURE	WHAT IT ANSWERS
Water volume / flow	How much mixed water passed a location? This does not reveal how much was raw sewage.
Pollutant concentration	How much of a named contaminant was present per unit of water? Dilution can lower concentration without stopping discharge.
Pollutant load	How much of that contaminant moved over time? It requires concentration and flow information, not a flow gauge alone.

IBT analytical implication: A smaller river flow can be beneficial without proving proportionally less infection risk. Likewise, high storm flow is not all raw sewage. Percentage-reduction claims need a baseline, comparable seasons and clarity about whether they describe water, contaminants, exceedances or bypass events.

THE NEEDED COMPARISON

Assess matched dry-season and wet-season performance, including extreme events, rather than comparing a quiet month after a repair with a storm-heavy historical period. Show raw data and operating interruptions alongside summary percentages.

08 / PUBLIC-SOURCE RESEARCH

Human health: contaminated-water exposure

08

Risk is real, but environmental evidence is not a diagnosis for an individual.

County public-health guidance identifies gastrointestinal and wound-related concerns from contaminated-water contact. Exposure can occur through swallowing water, contact with cuts, or contaminated hands and objects. Children, older adults and people with weakened immune systems may be more vulnerable. Water that looks clear or lacks a strong smell is not thereby cleared for recreation. [R28]

Separate the route, the event and the illness

A useful clinical history describes where contact occurred, when, how long it lasted, whether water was swallowed, whether skin was broken and what symptoms followed. A clinician can then select appropriate evaluation. A river sample collected on a different day cannot establish the organism responsible for an individual illness; nor does the absence of a reported diagnosis prove there was no exposure.

For swimmers, surfers, shoreline workers, cleanup personnel and flood-affected households, the practical distinction is between avoiding a known contaminated environment and trying to prove the precise source of each symptom. Prevention does not require certainty about a transmitting organism. Clinical attribution, however, requires more evidence than proximity alone. This is the report's interpretation of the public-health guidance, not a patient-specific medical opinion. [R28]

What this review does not establish

The sources reviewed do not provide a defensible total number of confirmed infections or deaths caused by this pollution across the affected population. They also do not establish that every local gastrointestinal, skin or respiratory complaint originates in the river. A reliable burden estimate would need exposure definition, diagnostic information, a comparison population and controls for other causes.

RIVER WATER IS NOT A MUNICIPAL TAP-WATER TEST

This report does not establish contamination of every Imperial Beach household's drinking water. A beach warning, river assay or sewage odor is not a substitute for the serving utility's drinking-water tests and advisories. Check that separate system rather than assuming either contamination or universal safety.

09 / PUBLIC-SOURCE RESEARCH

Human health: air exposure and new science

09

Gas release and sewage-associated aerosols are different mechanisms.

Hydrogen sulfide can escape directly from polluted water

The 2025 Science study examined a heavily polluted river as a regional air-quality source. Its associated UC San Diego account describes especially high localized emissions around turbulent flows, including the Saturn Boulevard crossing, and the influence of nighttime conditions. These measurements demonstrate why airborne exposure cannot be dismissed solely because a person stayed out of the ocean. They do not imply identical exposure throughout Imperial Beach. [R19] [R20]

Breaking waves and disturbed water can transfer material to air

Pendergraft and colleagues used bacterial and chemical evidence to trace coastal-water pollution into sea-spray aerosol. The research reported in 2023 drew on a 2019 sampling campaign. Source tracing establishes transport of sewage-associated material, but does not establish the viability of every detected organism or the number of resulting illnesses. [R21] [R22]

The 2026 viral study strengthens the exposure evidence

Fani and colleagues' August 2026 Environmental Pollution study examined paired air and water samples near the river and Imperial Beach. Targets included human-associated fecal markers, norovirus GII and adenovirus. It reports molecular detections in water and air and evaluates pepper mild mottle virus (PMMoV) as an airborne marker. PMMoV is a plant-virus indicator, not itself a human viral diagnosis. The study supports potential exposure; it does not convert gene copies into a demonstrated infection rate. [R23]

WHAT THE COMBINED RESEARCH SUPPORTS

Water-only precautions do not address every pathway. At the same time, "sewage material detected in air" is not equivalent to "everyone inhaled an infectious dose." Gas monitoring, aerosol measurements, organism viability, dose and clinical outcomes remain distinct evidentiary steps.

Public communication should state the measurement duration and location. A one-minute peak should not be presented as an annual average, and an occupational limit should not be substituted without explanation for a community-health guideline.

10 / PUBLIC-SOURCE RESEARCH

September 2026 federal health assessment

10

The new ATSDR consultation is important precisely because its conclusions are specific.

ATSDR released a public-comment health consultation in September 2026 focused on outdoor hydrogen sulfide. It is not a completed assessment of every chemical, pathogen, soil pathway or disease associated with the river. Public comment is open through November 21, 2026; further work on other environmental media is separate. [R17]

FINDING IN THE CONSULTATION	HOW TO INTERPRET IT
Odors can harm well-being and produce symptoms.	Odor-related headache, nausea, irritation and stress should not be dismissed merely because a toxicological screening threshold is not exceeded.
Short-duration public-health hazard at Leon Avenue; likely concern at Berry Elementary.	The highest reported 30-minute rolling mean at Leon Avenue was 3,021.5 ppb in September 2024. Berry's early-period inference uses proximity and correlated observations, not identical direct data coverage.
Longer-duration exposures evaluated at four sites were not expected to produce additional toxicological effects beyond the short peaks.	This is not a statement that odors are harmless, that every pollutant is safe, or that decades of exposure have been characterized.
Earlier exposure cannot be fully evaluated.	The assessment cannot reconstruct conditions before September 2024 from missing monitoring data.

Source for the table: ATSDR consultation, executive conclusions and exposure discussion. [R16]

Why both the concerning and reassuring findings belong

A fair account should not suppress the short-term hazard finding to make the situation sound resolved. It should also not suppress the longer-duration finding to imply that this assessment proves a uniform, chronic toxic exposure across the entire region. The research institution's explanation likewise emphasizes the relationship between localized measurements and the broader assessment. [R18]

CLINICAL AND GEOGRAPHIC LIMIT

This is an environmental consultation, not a diagnosis of a particular resident. It supports exposure reduction and further assessment while leaving individual causation, many co-pollutants and long-term population outcomes unresolved.

11 / PUBLIC-SOURCE RESEARCH

What the community health surveys show

11

Household experience is evidence of community burden, but survey design controls what can be concluded.

The 2024 CASPER survey used a cluster-sampling approach and completed 189 household interviews from October 17-19. It was designed to describe the defined South Bay study area, not all of San Diego County or every individual resident. The 2026 follow-up was scheduled for September 17-19; its results were not available on the reviewed page at the cutoff. [R25]

2024 CASPER ESTIMATE	REPORTED HOUSEHOLD EXPERIENCE
94%	Noticed sewage odor in the preceding month.
80%	Reported a negative quality-of-life effect.
69%	Had at least one person with symptoms the respondent attributed to sewage exposure.
18%	Reported seeking medical care.
56% / 59%	Reported sleep disruption / increased household stress.
75%	Reported reducing outdoor activities.

Values are rounded, weighted household estimates from the CDC/County fact sheet, not laboratory-confirmed disease rates. [R26]

ACE is complementary, not interchangeable

The online ACE survey collected voluntary responses during October-November 2024, including residents, workers and people who used affected areas for recreation. It reaches experiences that a household sample may miss, but its self-selected participation does not support treating its respondent percentages as population prevalence. [R27]

IBT interpretation: The surveys substantiate disruption and perceived health burden. Their main limitations for causal inference include recall, participation differences, self-attributed symptoms and other possible causes. Repeating surveys with comparable methods can show trends, but changing respondents or questions can itself change the result. Neither survey should be used to claim a measured 2026 infection incidence.

12 / PUBLIC-SOURCE RESEARCH

What is still unknown about health

12

Uncertainty is a reason to improve measurement, not to treat all concerns as either proven or imaginary.

UNRESOLVED QUESTION	EVIDENCE NEEDED
How many illnesses are attributable to pollution?	Exposure-linked clinical data, appropriate comparison groups and adjustment for other causes.
Are airborne organisms infectious at the dose encountered?	Viability, exposure-dose and route-specific studies, not genetic detection alone. [R21] [R23]
What are the combined effects of multiple exposures?	Co-located chemical and biological monitoring, duration data and mixture-specific assessment.
How do exposures differ by neighborhood and occupation?	Time-resolved monitoring and activity information, including schools, outdoor work and vulnerable groups.
What preceded the monitoring record?	Historical measurements or defensible reconstruction; unavailable observations cannot be invented. [R16]

A disciplined interpretation of "not proven"

Lack of a causal estimate does not mean residents have not suffered. It means that an exact disease count or source attribution is not established by the available study design. Conversely, a plausible pathway is not permission to assign every illness to the river. Both errors weaken the usefulness of the evidence.

The next useful comparisons are linked to actual interventions: before and after a diversion change; upstream and downstream of an interception project; high- and low-exposure neighborhoods under comparable weather; and repeated health surveys using consistent methods. These are proposed evaluation approaches, not studies this report has conducted.

HEALTH BURDEN IS BROADER THAN INFECTION COUNTS

Disrupted sleep, restricted outdoor activity, odor-related distress and interrupted access to public space can matter even when a particular infectious diagnosis is not established. The CASPER and ACE programs measure parts of that burden; they should not be relabeled as clinical surveillance. [R26] [R27]

13 / PUBLIC-SOURCE RESEARCH

Environmental damage and recovery 13

The estuary is a living system, not an empty drainage channel.

The Tijuana Slough refuge supports more than 370 recorded bird species and provides habitat for federally listed species including the light-footed Ridgway's rail, California least tern, least Bell's vireo, California gnatcatcher and western snowy plover. These records demonstrate the ecological stakes; they do not establish a sewage-attributable population decline for each species. [R29]

The mechanisms of ecological harm

Research on estuarine water quality documents polluted-flow signals, stratification and hypoxia. Oxygen depletion can reduce the suitability of water for fish and invertebrates and change the food base available to birds. The response depends on water residence time, tidal mixing and the pattern of contaminant delivery, not just the visible appearance of the river. [R24]

Trash and excess sediment create a separate physical burden. They can obstruct channels, alter habitat and increase the work needed to maintain flood conveyance. Historical research also documents major changes from development and river modification. A restoration program therefore needs to distinguish current sewage effects from accumulated physical alteration and other ecological pressures. [R08] [R42]

RECOVERY OBJECTIVE	WHY TREATMENT ALONE IS INSUFFICIENT
Improve water quality	Pollution sources must remain controlled through ordinary operation and disruptive events.
Restore habitat function	Sediment patterns, channel connections, invasive species and vegetation may still require management.
Rebuild biological resilience	Species recovery depends on habitat, food, disturbance and other pressures as well as cleaner water.
Maintain flood compatibility	Restoration must be designed with safe water conveyance and long-term maintenance, not treated as an isolated landscaping project.

The objectives above are IBT's synthesis of the research, not a site-specific restoration design or a quantified prediction of species recovery. A comprehensive ecological damage total and a single verified restoration completion date were not established in the reviewed record.

14 / PUBLIC-SOURCE RESEARCH

Animal health: pets, horses and wildlife

14

Animal risks deserve attention without inventing an outbreak or death count.

Companion animals and contaminated environments

Pets can encounter polluted water, mud, debris and contaminated surfaces at a different height and with different behavior than people. Preventing them from drinking or playing in posted or visibly polluted water is a practical extension of avoiding the exposure route. A dog's willingness to enter water is not evidence that the water is safe.

Leptospirosis is an example of a general veterinary concern involving water or soil contaminated by infected animals' urine. It can cause serious illness in dogs, and vaccination and exposure prevention should be discussed with a veterinarian. This is general AVMA guidance, not evidence that a Tijuana River-associated leptospirosis outbreak has been confirmed. [R30]

Horses and working animals

For horses and other animals kept near the valley, a useful exposure review would document access to drainage water, flooding of enclosures, drinking-water sources, contact with contaminated sediment and veterinary findings. This report did not identify a reliable local dataset that establishes attributable illness or mortality rates for those animals. Human survey complaints cannot substitute for veterinary diagnosis.

Wildlife effects need ecological and veterinary evidence

A polluted estuary can harm wildlife indirectly through loss of suitable feeding habitat and changes in fish or invertebrate communities. A specific dead bird, fish or mammal, however, requires appropriate investigation before assigning cause. The refuge's species records and the estuarine research establish ecological exposure concerns, not a cause of death for every animal found locally. [R29] [R24]

PRACTICAL ANIMAL PROTECTION

Keep animals away from contaminated water and flood debris; bring uncontaminated drinking water; seek veterinary advice after significant exposure or new symptoms. Do not enter polluted water to retrieve wildlife or handle carcasses without appropriate guidance. Local incident documentation should preserve the place, date and veterinary or wildlife-agency findings, not just a suspected cause.

15 / PUBLIC-SOURCE RESEARCH

Community and economic damage 15

Lost access and disruption are documented; large dollar estimates require careful labeling.

Beach and outdoor-access restrictions can affect recreation, visitor activity, businesses, workers and households. Household surveys document reduced outdoor activity and quality-of-life disruption. These are real categories of harm even when not converted into a verified dollar total. [R26]

What the September 2026 economic presentation estimates

The County/ECOnorthwest preliminary presentation gives a prospective cumulative economic-output impact range of roughly **$1.9 billion to $7.9 billion for 2025-2045**. The range reflects different historical calibration periods, including 2008-2025 versus 2020-2025. It is not a bill already incurred, a cleanup construction budget, a prediction that must occur, or a count of personal medical costs. [R31]

The same presentation cautions against attributing all school-attendance differences directly to sewage and does not establish a uniform collapse in property values. Its outreach includes survey and focus-group information; those inputs and the model deserve methodological review before the estimates are treated as realized damages. [R31]

IMPACT CATEGORY	USEFUL MEASURE FOR FUTURE REVIEW
Recreation and access	Beach-segment closure days, park/trail restrictions and participation patterns.
Business activity	Comparable sales, visitor spending and employment trends, with seasonality and broader economic conditions accounted for.
Household burden	Medical visits, missed work, cleaning/filtration costs, sleep disruption and lost outdoor use.
Public services	Monitoring, emergency response, infrastructure repair, maintenance and school disruptions.
Ecosystem services	Habitat function, recreation value and restoration requirements, without double-counting benefits.

The table is an IBT evaluation framework, not a claim that every listed loss has been measured. Economic output, personal welfare, government spending and property values are different quantities and should not simply be added together.

16 / PUBLIC-SOURCE RESEARCH

Who controls which part of the system

16

Accountability requires identifying functions, not assigning every responsibility to one office.

INSTITUTION / GROUP	RELEVANT FUNCTION
U.S. and Mexican IBWC sections	Binational implementation, boundary-related infrastructure, coordination and treaty-minute responsibilities. The U.S. section owns South Bay. [R04] [R10]
EPA and Mexican federal agencies	Program funding, technical coordination and binational commitments; SEMARNAT participates in the current framework. [R01] [R12]
Baja California / CESPT	Mexican-side water and sewer infrastructure and operational roles identified in binational agreements. [R14]
NADBank	Financing and certification roles, with proposed maintenance-finance mechanisms under Minute 333. [R14]
California water regulators	U.S.-side discharge permits, compliance oversight and specified monitoring requirements. [R44]
County public health and air district	Health assessment, exposure guidance, air monitoring and community programs. [R25] [R37]
Cities, land managers and community organizations	Local access, habitat stewardship, planning, monitoring, advocacy and litigation within their respective roles. [R29] [R32] [R35] [R36]

What a treaty minute does - and does not do

A treaty minute can set responsibilities and commitments, but execution still involves design, national funding processes, procurement, operation and public reporting. Minute 333 includes both projects and evaluations. A feasibility study should therefore not be counted as a financed construction contract. [R14]

IBT governance interpretation: A successful accountability register needs a named owner, scope, budget source, current milestone, operating obligation and outcome measure for each asset. When those fields are missing, the public cannot tell whether a delay belongs to funding, engineering, construction, operations or an unresolved interagency decision.

17 / PUBLIC-SOURCE RESEARCH

Why it remains unresolved despite action

17

The evidence supports structural explanations; it does not establish that all institutions did nothing.

What the federal audit actually found

GAO's 2020 review documented aging infrastructure, limitations in planning and difficulties with emergency response and cross-agency coordination. Those findings help explain why a repair-by-repair approach did not necessarily create a durable system. They are historical audit findings, not a blanket present-tense verdict about every agency. [R05]

Important corrections to outdated accounts

The current GAO tracker marks the Tijuana-related congressional matter on authority as **closed-implemented**, citing funding transfers and use of existing authority. It also marks the capital-planning recommendation **closed-implemented**, following asset-management work. The rapid-response recommendation remains **open-partially addressed**. An unrelated Santa Cruz River entry should not be mistaken for the Tijuana finding. [R04]

Closing an audit recommendation means the specified administrative action met the audit's intent. It does not mean the estuary recovered or that the treatment plant cannot fail. Conversely, repeating a closed recommendation as though no response occurred misrepresents the record.

Why additional spending has not created an instant result

The 2024 South Bay contract described substantial rehabilitation while keeping the plant operating. Its schedule allowed design and construction overlap but still involved years of work. Building new processes within a functioning facility is different from replacing a standalone appliance. [R13]

Minute 333's continuing emphasis on operating finance, additional capacity, system accounting and future demand shows that the problem extends beyond a single plant expansion. A new project can address one bottleneck while leaving others. [R14]

ANSWER TO "WHY NOTHING HAS BEEN DONE"

The supported question is: why has completed work not yet produced sustained basin-wide control? The record points to deteriorated assets, interconnected failures, phased construction, maintenance needs, multiple jurisdictions and incomplete coverage of pollution pathways. It does not support an invented motive, a blanket corruption finding or the claim that no work occurred.

18 / PUBLIC-SOURCE RESEARCH

Where it stands today: progress versus proof

18

The current snapshot is a construction and operating transition, not a final clearance.

What the latest performance announcement means

EPA's September 30 announcement describes marked improvement in selected operational indicators. The figures in the executive assessment should be read as agency-reported comparisons, not independently audited watershed health scores. A reduction in plant exceedances is not the same variable as a reduction in contaminated beach days; neither directly measures illness. [R02]

The 35-MGD number needs its treatment definition

The regional regulator describes **35 MGD of advanced primary treatment but 25 MGD of secondary treatment**, with up to 10 MGD of advanced-primary effluent blended with secondary effluent before discharge. This is not equivalent to 35 MGD receiving the same secondary process. [R44]

The distinction does not mean the extra capacity has no benefit. It means that the public should assess the authorized process, actual throughput and effluent compliance together. Nominal capacity alone cannot tell whether a discharged pollutant load is acceptable.

Independent and community monitoring still matters

Coastkeeper's September 2026 release summarizes a 2025 sampling program at two to four river/canyon sites, with canyon visits conditional on flowing water. It reports substantial bacterial contamination and chemical detections. That is valuable location-specific evidence, but it should not be relabeled as a live reading for October 2, 2026 or as an independently proven share attributable to every industrial source. [R35]

UNVERIFIED LIVE CONDITIONS

This review did not independently establish the exact open/closed status of every beach segment or the current air reading in each neighborhood. Use the County beach-status resource and SDAPCD monitoring for the time and place of an intended activity. A project milestone is not permission to enter the water. [R39] [R37]

19 / PUBLIC-SOURCE RESEARCH

Project register: infrastructure delivery

19

Agency dates below are targets. Completion must be confirmed with commissioning and performance records.

PROJECT	LATEST REVIEWED STATUS / TARGET
South Bay interim expansion	35 MGD completed August 2025.
Parallel Gravity Line	Completed August 2026.
South Bay 50-MGD expansion	Primary-works phase awarded September 2026; full design approval targeted October 2026.
La Morita / Arturo Herrera	Relocate 10 MGD of treated effluent; completion December 2027.
PB-1	Construction underway; completion November 2027.
Antiguo Force Main	14,000-foot replacement; expected 2027.
River Gates	Eight of eleven phase-one segments completed; phase two underway; completion early 2027.
Matadero / Laureles II pumps	Funds obligated; construction start expected December 2026.
Poniente / Oriente / Carranza	Sewer rehabilitation; completion targets December 2026.
Insurgentes Collector	Completion target July 2027.

Source for register: September 30, 2026 EPA/SEMARNAT quarterly update. These are the source's status labels, not an independent engineering inspection. [R01]

How to interpret the different functions

A gravity line or force main moves wastewater; a treatment plant changes its quality. A pump rehabilitation improves conveyance reliability; it does not independently remove pathogens. Relocating already-treated effluent changes where water goes; it is not the same as intercepting an equal volume of raw sewage or creating potable water. These distinctions are essential when comparing project benefits.

Do not add the nominal volumes of these projects into a single "sewage eliminated" total. Some projects act on the same water sequentially. A defensible cumulative benefit requires a system-wide flow and pollutant accounting model, including overlaps, bypasses and actual operating availability.

20 / PUBLIC-SOURCE RESEARCH

Project register: what is not yet a built solution

20

Planning, feasibility and supporting controls remain important, but their status must be explicit.

WORKSTREAM	WHAT IS ESTABLISHED	WHAT IS NOT ESTABLISHED
Tecolote-La Gloria plant	Minute 333 specifies a roughly 3-MGD facility with a December 2028 commitment. [R14]	Commissioning is not established as of this review.
Further SAB expansion / outfall	Minute 333 calls for feasibility assessment, including potential expansion from about 18.26 to 43.37 MGD. [R14]	The evaluated capacity is not installed capacity or a fully funded construction promise.
System monitoring and mass balance	Binational framework calls for improved flow accounting and data exchange. [R14]	A requested monitoring system is not evidence that complete, validated public data already exist.
Saturn Boulevard permanent work	CEQAnet documents $4 million of preconstruction activities. [R34]	Design and review funding do not establish a completed permanent crossing or a treatment plant.
Capture and Cleanup Initiative	County planning scope funds feasibility work for U.S.-side alternatives. [R32] [R33]	Final site, design, operating capacity, full construction cost and commissioning date are not established.

Odor control is not the same as wastewater treatment

Changing a turbulent crossing can reduce gas release at a hotspot without eliminating the contaminants carried downstream. The Science study's focus on water-to-air emissions explains the value of controlling turbulence, but the separate water-quality and ecological questions remain. [R19] [R20]

IBT evaluation rule: Novel treatment or odor-control pilots need independent performance data, operating cost, failure behavior, byproduct assessment and scale-up evidence. A preliminary demonstration should not replace the conventional collection, treatment and maintenance functions before those tests are met.

21 / PUBLIC-SOURCE RESEARCH

Trash, sediment and local controls

21

These projects can deliver practical relief without constituting a complete wastewater solution.

A completed interception system still needs operating money

In July 2026, the State Water Board reported that the Tijuana River trash-boom system had captured about 2,000 tons of debris over two storm seasons. The project began with a $4.7 million grant; the board allocated another $2 million for continued operation and maintenance. The announcement says the additional money was needed to prevent the program from stopping. These are agency-reported results, not measurements independently audited for this report. [R43]

This example makes the maintenance issue concrete: a functioning structure still needs personnel, removal, transport and disposal. The debris does not disappear when trapped. The performance question is whether interception and removal continue during the conditions that generate the load, without compromising flood safety.

Sediment is a separate assessment and restoration problem

The regional regulator reports an allocation of $1.4 million for a Tijuana River Valley and estuary sediment-quality assessment, with sampling anticipated as early as summer 2027. An assessment identifies what should be managed and where; it is not itself a completed sediment cleanup. [R03]

CONTROL	BENEFIT AND LIMIT
Trash interception	Keeps captured solid waste from moving farther downstream; does not disinfect water or remove all dissolved chemicals.
Sediment management	Can address accumulation and associated habitat or flow problems; requires characterization, lawful disposal and attention to recontamination.
Crossing / turbulence controls	Can reduce a gas-release hotspot; do not replace collection and treatment of wastewater.
Broader border grants	The July 2026 state announcement described a $46 million Proposition 4 solicitation covering Tijuana and the New River. It is not all money spent in Imperial Beach. [R43]

The functional distinctions in the table are IBT interpretation, not an engineering endorsement of a specific removal method. Necessary controls should be evaluated for treatment, air quality, habitat and flood effects together.

22 / PUBLIC-SOURCE RESEARCH

Funding: what the numbers do and do not buy

22

Public announcements often mix appropriations, commitments, estimates and overlapping project scopes.

AMOUNT / SOURCE	WHAT IT REFERS TO	ACCOUNTING LIMIT
$300 million	USMCA-related EPA supplemental funding, later transferred for implementation. [R04]	Not automatically additional to every later project estimate.
$474 million	2022 binational framework: $330 million U.S. and $144 million Mexican commitments. [R12]	Historical package, not a verified total of all spending through 2026.
About $600 million	2024 South Bay rehabilitation/expansion estimate including contingency and project management. [R13]	One major plant scope, not the whole watershed's final cost.
$1.8 million	County Capture and Cleanup feasibility/planning initiative. [R32] [R33]	Not construction financing for an operating plant.
$4 million	Saturn Boulevard preconstruction activities. [R34]	Not proof that permanent construction is fully funded or complete.

Why a grand total would mislead

These figures come from different years, programs and accounting categories. Adding them would risk double counting transferred or repackaged money and mixing a cost estimate with an appropriation. This report therefore does not present their sum as "money spent" or claim it equals the remaining funding gap.

The less visible recurring bill

The February 2025 South Bay fact sheet describes a funded rehabilitation scope and significant asset-condition needs. Minute 333 separately addresses operating and maintenance finance. Together, they illustrate the difference between having money for construction and sustaining a multi-facility system after construction. [R41] [R14]

IBT financial verification standard: Request appropriations, contracts, actual spending, contingencies, change orders and a multiyear operating budget. Verify staffing, power, consumables, solids disposal and replacement reserves. "Funded" should identify the obligations covered.

23 / PUBLIC-SOURCE RESEARCH

Reconciling the official timelines

23

The dates describe different projects, and some published schedules have not been synchronized.

Why "2027" is not a universal finish line

The near-term delivery register includes several Mexican-side repairs, conveyance upgrades and effluent relocation tasks. Their targets should not be silently extended to the full U.S. plant expansion, every stormwater source or ecosystem restoration. The 2022 program itself described projected reductions, not elimination of all possible contamination. [R12]

The important unresolved full-plant date

The Water Board's September 25, 2026 page still states that South Bay rehabilitation and expansion construction is expected to last through **mid-2031**. The later September 30 EPA update describes the major primary-treatment phase award and near-final design, but does not supply a new final commissioning date in that update. These are different statements; neither should be rewritten as a verified promise of full completion in 2027. [R03] [R01]

The 2024 project announcement described a long design-and-construction program with possible overlap. That helps explain the later multi-year timeline, but an old duration estimate is not a guarantee that acceleration is impossible or that the current critical path is unchanged. [R13]

MILESTONE	NECESSARY DISTINCTION
Design approval	Design is ready to proceed; the facility is not necessarily built.
Contract award	A scope has been procured; the asset is not necessarily operational.
Substantial construction completion	Commissioning, testing and defects correction may remain.
Commissioning and compliance	The asset operates and meets relevant requirements; watershed-wide effects still need observation.
Sustained environmental recovery	The outcome holds across seasons, failure events and biological response times.

The milestone definitions form an IBT reading framework. A transparent schedule should show which date is being promised, the remaining dependencies, and the evidence required to declare the milestone achieved.

24 / PUBLIC-SOURCE RESEARCH

A realistic cleanup timeline

24

Conditional planning scenarios - not a probability forecast and not an official government deadline.

PLANNING BAND	REALISTIC OBJECTIVE	WHAT COULD PREVENT IT
2026-2027	More reliable collection and reduced pollution from individual completed works; localized exposure improvements where controls perform.	Construction slippage, another infrastructure failure, weak operating reliability or a different pollution pathway remaining active.
2028-2031	Commissioning and integration of major remaining works, followed by evidence of sustained improvement over multiple seasons.	The full-plant schedule changes; projects overlap poorly; wet-weather loads exceed design; operating funds or source controls remain inadequate.
2030s and beyond	Longer ecological recovery and restoration of repeatedly damaged habitats, with continued monitoring.	Legacy sediment or physical habitat damage, new development pressures, recurrent pollution and incomplete restoration financing.
Permanent obligation	Preventive maintenance, staffing, upgrades, source control and renewed capacity as demand changes.	Treating construction completion as the end of the program.

These bands are **IBT analytical scenarios** based on the different project scopes, the still-posted full-plant horizon, Minute 333's additional work and the historical ecological record. They are not modeled probabilities or estimates of the date any particular beach will reopen. [R03] [R14] [R42]

Could it ever be cleaned up?

There is no physical principle in the reviewed record that makes major improvement impossible. The relevant tasks - collection, conveyance, treatment, monitoring and maintenance - are identifiable. But "cleaned up" must mean a measurable level of controlled pollution and usable, resilient environments, not a guarantee of zero contaminants during every future storm.

THE PRACTICAL CONCLUSION

Plan for phased improvement, verify it, and budget for permanent operation. A credible declaration of recovery would follow sustained water and air measurements, compliant treatment, fewer contamination-related closures and ecological evidence. It would not follow automatically from spending a headline sum or reaching a construction date.

25 / PUBLIC-SOURCE RESEARCH

How to tell whether the cleanup is working

25

A proposed public performance dashboard should measure outcomes, not just activity.

DOMAIN	METRIC TO PUBLISH	WHY IT MATTERS
Collection and treatment	Daily captured, bypassed and treated volumes; process level; outage hours; effluent results.	Separates nameplate capacity from actual reliable service.
River and coast	Flow plus pollutant concentrations and loads; dated beach-segment status; dry/wet-season comparisons.	Avoids equating less flow with an equal reduction in risk.
Air exposure	Location, averaging period, completeness and frequency of H2S peaks; relevant co-pollutant studies.	Avoids hiding peaks inside averages or projecting one station across the whole city.
Community health	Repeat comparable surveys and exposure-linked clinical research with privacy protections.	Tests changes in experience and disease without overstating causal attribution.
Ecology	Dissolved oxygen, habitat condition, sediment/trash burden and biological indicators.	Measures recovery beyond the treatment plant fence.
Delivery and finance	Baseline and revised schedules; change orders; operating funds; responsible owner.	Shows whether delays or reliability problems have an identifiable cause and response.

This dashboard is an **IBT proposal for evidence organization**, not a statutory standard or a finding that all listed measures are currently published. Thresholds and sampling plans should be set with the relevant regulators and subject-matter specialists, not invented in a branding document.

An outcome-based definition of success

Success would include stable treatment performance, demonstrably controlled routine sewage discharges, transparent management of exceptional events, safer access based on official monitoring, reduced exposure peaks and improving ecological condition. The evidence should persist across more than one favorable month. The required follow-up period depends on the outcome; a restored habitat and a repaired pump do not respond on the same clock.

26 / PUBLIC-SOURCE RESEARCH

Resident, worker and animal protection

26

Use live public guidance for a specific time and place; this report is not a real-time clearance.

Water and shoreline activity

Check the County's live beach-status resource before entering coastal water and comply with posted closures and advisories. Avoid contaminated drainage and floodwater. After contact, follow public-health washing and wound-care guidance; seek medical evaluation for concerning or persistent symptoms and describe the exposure. [R39] [R28]

Air and indoor environments

Use SDAPCD's monitoring and current community guidance for odor and hydrogen sulfide conditions. The district also describes its Air Improvement Relief Effort. Particle filters and gas-removal media serve different purposes: HEPA performance should not be mistaken for removal of hydrogen sulfide gas. EPA advises selecting appropriate pollutant controls and warns that air cleaning has limitations. [R37] [R38]

For severe breathing difficulty, collapse or another acute emergency, seek emergency help rather than waiting for a dashboard update. For recurring symptoms, record dates, location and activity for a clinician; do not infer a diagnosis from odor strength alone. Follow professional safety procedures for work in contaminated areas, especially confined spaces.

Pets and horses

Keep animals out of contaminated water and away from flood debris; provide an uncontaminated drinking source. A veterinarian should evaluate relevant symptoms and advise on risk reduction, including routine vaccination decisions. Do not assume a human household survey establishes the cause of an animal's illness. [R30]

DIRECT PUBLIC RESOURCES

Water: County beach-status map. [R39] **Air:** SDAPCD Tijuana River Valley page. [R37] **Regional context:** County environmental dashboard. [R40] **Projects:** EPA quarterly status reports. [R01] **Health assessment:** ATSDR consultation and comment process. [R16] [R17]

These links are provided as action resources. Their inclusion is not a claim that every live figure or present beach restriction was extracted and verified during this review.

27 / PUBLIC-SOURCE RESEARCH

Next milestones and records that would resolve uncertainty

27

A useful follow-up should update the evidence, not simply repeat the latest announcement.

RECORD / MILESTONE	QUESTION IT WOULD ANSWER
Approved South Bay full design and integrated construction schedule	What is the current commissioning date, critical path, contingency and scope of each treatment phase?
Commissioning and operating records for completed conveyance work	Did completion reduce bypasses and interruptions under comparable conditions?
Published mass-balance study and real-time monitoring framework	How do flows, diversions, treatment and discharge reconcile without double counting?
Final ATSDR consultation and subsequent media assessments	Did public comments change conclusions, and what do other contaminants and pathways show? [R17]
2026 CASPER findings	Did comparable household indicators improve, worsen or remain similar? Results were not available in the reviewed record. [R25]
County feasibility alternatives and their lifecycle costs	What can the Capture and Cleanup Initiative deliver, where, at what cost, and with whose operating responsibility? [R32] [R33]

Why the county initiative is not an 18-month cleanup promise

The county board letter gives an approximately 18-month first-phase evaluation process. Starting from September 2026, that would point roughly to March 2028 for the planning product if the period runs as described. That date is a calendar inference for feasibility work, **not** a promised operating treatment facility. Later design, approvals, funding and construction would still require their own schedules. [R32]

Overall conclusion

The public record supports continued concern, documented progress and a demand for measurable delivery. It does not support either resignation that improvement can never occur or a declaration that the whole problem is already solved. The most defensible expectation is a staged reduction of exposures and discharges, verified through data, followed by a longer period of ecological recovery and continuous maintenance.

28 / PUBLIC-SOURCE RESEARCH

Glossary and review limitations

28

Use these distinctions when reading project announcements, test results and public claims.

TERM	MEANING IN THIS REPORT
MGD	Million gallons per day: a flow or capacity unit, not a pollutant-removal percentage.
Primary / secondary treatment	Different process stages. More hydraulic capacity does not automatically mean the same treatment level for every gallon.
Effluent / influent	Water leaving / entering a treatment process. "Treated" does not mean drinking water.
Hydrogen sulfide (H2S)	A gas associated with wastewater decomposition; evaluated by concentration, location and duration.
ppb	Parts per billion. The averaging period must accompany an exposure comparison.
Molecular detection	Detection of genetic material; not by itself proof of viable organisms or a clinical infection.
Hypoxia	Low dissolved oxygen in water, with consequences for aquatic organisms.
O&M;	Operations and maintenance: the continuing work and expenditure needed after construction.
Commissioning	Testing and bringing a facility into operation; distinct from design approval or contract award.
IBWC minute	A binational instrument implementing treaty-related arrangements; its tasks can include both projects and studies.

This report is a public-source synthesis, not an original epidemiological study, engineering design, legal opinion, certified financial audit or field inspection. Information was accessed through publicly available records. Agency announcements, research abstracts, consultant presentations and advocacy-organization reports are identified by type. No private medical or personal records were used.

The report does not assign fault to a named person, prove a specific industrial source, estimate an attributable death toll, certify tap-water quality, or provide a live beach/air clearance. Source publication dates and observation periods can differ. Projections are labeled; missing records remain missing.

SOURCE REGISTER

Sources & traceability

All sources were consulted for this report as of October 2, 2026. Titles are linked to their public location. Government and research sources are prioritized; original county documents hosted by news publishers are identified as such. The bibliography is a source guide, not a claim that every underlying dataset was independently audited.

R01 Tijuana River Watershed Public Updates

U.S. EPA / SEMARNAT | September 30, 2026; earlier quarterly updates also reviewed.

Project status and target dates, not independent verification of commissioning or beach safety.

R02 Tijuana sewage crisis quarterly update: project and performance announcement

U.S. EPA | September 30, 2026.

Source of agency-reported percentage improvements; underlying time series were not independently recalculated.

R03 U.S.-Mexico Border Water Quality

San Diego Regional Water Quality Control Board | Page updated September 25, 2026.

Regulatory account of treatment configuration, permits, infrastructure, ecological conditions and state projects. Some embedded historical schedules differ from later EPA updates.

R04 International Boundary and Water Commission: Opportunities Exist to Address Water Quality Problems (GAO-20-307)

U.S. Government Accountability Office | February 2020; recommendation tracker consulted October 2, 2026.

Use current recommendation status rather than assuming all 2020 deficiencies remain administratively unresolved.

R05 GAO-20-307: full audit report

U.S. Government Accountability Office | February 2020.

Historical audit of infrastructure planning, authority and emergency-response issues; not a 2026 inspection.

R06 Tijuana River watershed overview (archived)

U.S. EPA | Historical background page.

Used for watershed geography, not old population counts or present operating conditions.

R07 Tijuana River Watershed / USMCA program

U.S. EPA | Current program page consulted October 2, 2026.

Program context and pollution pathways. Linked official flow schematic provides geographic orientation.

R08 Tijuana River Valley Historical Ecology Investigation: research announcement

San Francisco Estuary Institute | 2017.

Historical changes integrate land use, channel modification and other drivers; not all habitat loss is attributable to sewage.

SOURCE REGISTER / CONTINUED

Sources & traceability

R09 Historical Ecology Study

Tijuana River National Estuarine Research Reserve | Research library entry consulted October 2, 2026.

Local research context and links to historical ecological investigation.

R10 Western Area field office: South Bay facility and flood-control history

U.S. International Boundary and Water Commission | Historical facility account.

Used for 1977, 1997 and 1999 milestones only; legacy capacity descriptions are not treated as current.

R11 Final revised Record of Decision: South Bay treatment

U.S. International Boundary and Water Commission | 2008.

Selection of U.S.-side secondary treatment; projected dates in this decision are not proof of actual commissioning.

R12 U.S. and Mexico agree to invest $474M to address Tijuana River sewage problem

U.S. EPA | August 18, 2022.

Dated commitments and modeled benefits, not measured 2026 outcomes.

R13 Partners celebrate launch of South Bay plant rehabilitation and expansion

U.S. International Boundary and Water Commission | October 29, 2024.

Historical contract scope, cost estimate and construction-duration assumptions.

R14 Minute No. 333

U.S.-Mexico International Boundary and Water Commission; EPA publication | Signed December 15, 2025.

Distinguishes binding framework and planned work from feasibility studies, funding conditions and later revised schedules.

R15 Mexico and United States reinforce cooperation on Tijuana-San Diego sanitation projects

SEMARNAT, Government of Mexico | April 22, 2025.

Mexican government account of San Antonio de los Buenos completion and remaining works; historical acceleration aspirations are not adopted as current deadlines.

R16 Evaluation of Hydrogen Sulfide in Outdoor Air: Environmental Contamination in the Tijuana River

Agency for Toxic Substances and Disease Registry | September 23, 2026; public-comment version.

80-page consultation; conclusions are location-, duration- and pollutant-specific. Public comment closes November 21, 2026.

R17 Hydrogen sulfide and odors in Tijuana River Valley outdoor air can negatively affect health

Agency for Toxic Substances and Disease Registry | September 2026.

Agency explanation of consultation, scope, public-comment process and further assessment work.

R18 New federal health assessment builds on UC San Diego findings

University of California San Diego | September 2026.

Research institution interpretation of its measurements and federal assessment; not an independent diagnosis of residents.

SOURCE REGISTER / CONTINUED

Sources & traceability

R19 Heavily polluted Tijuana River drives regional air quality crisis

Rico and colleagues, Science | 2025; DOI 10.1126/science.adv1343.

Primary research on gas emissions and air quality. Sampling campaigns are not continuous citywide exposure records.

R20 Tijuana River's toxic water pollutes the air

University of California San Diego | 2025.

Original institution account of the Science study, including turbulence and localized gas measurements.

R21 Bacterial and Chemical Evidence of Coastal Water Pollution from the Tijuana River in Sea Spray Aerosol

Pendergraft and colleagues, Environmental Science & Technology | 2023.

Primary research tracing water-to-air transfer; detection and source attribution do not establish pathogen viability or clinical incidence.

R22 Coastal water pollution transfers to the air in sea spray aerosol

University of California San Diego | 2023.

Original university description of the 2019 sampling campaign reported in 2023.

R23 Human-Associated Viral Pathogens in Water and Air and Evaluation of PMMoV as an Indicator of Airborne Viruses near the Tijuana River, CA

Fani, Stigler Granados, Quintana and Verbyla; Environmental Pollution | August 2026; DOI 10.1016/j.envpol.2026.128860; PMID 42546795.

Primary study abstract reviewed: paired water/air sampling and molecular markers. No inferred infection rate from genetic detection.

R24 Evaluation of real-time fluorescence sensors for wastewater contamination and estuarine conditions

Mladenov and colleagues, Science of the Total Environment; NOAA repository | 2024; volume 950, article 175137; DOI 10.1016/j.scitotenv.2024.175137.

Primary research on sensor signals, polluted flows, stratification and hypoxia; sensor performance depends on conditions.

R25 CASPER study: Tijuana River Valley

County of San Diego Public Health Services / CDC | 2024 survey and 2026 follow-up information.

2026 follow-up results were not posted on the reviewed page as of the report cutoff.

R26 Tijuana River sewage crisis: 2024 CASPER findings fact sheet

CDC / County of San Diego | Survey October 17-19, 2024.

Weighted household estimates, rounded. Symptoms and attribution are self-reported; results are not diagnosed disease incidence.

R27 Assessment of Chemical Exposures (ACE) survey

County of San Diego Public Health Services / ATSDR | Survey October 21-November 22, 2024; subsequent results page.

Voluntary online participation includes residents, workers and recreational users. Selection differs from CASPER.

SOURCE REGISTER / CONTINUED

Sources & traceability

R28 About contaminated water

County of San Diego Public Health Services | Page consulted October 2, 2026.

Public-health guidance for contaminated water. Older discussion of airborne research is read alongside 2026 primary research.

R29 Tijuana Slough National Wildlife Refuge: species

U.S. Fish and Wildlife Service | Current refuge information consulted October 2, 2026.

Biodiversity and listed-species context; older nesting or population counts on linked pages are not used as current totals.

R30 Leptospirosis: pet-owner information

American Veterinary Medical Association | Guidance consulted October 2, 2026.

General veterinary pathway and prevention context only; no local Tijuana River outbreak is established by this source.

R31 Economic impacts of pollution in the Tijuana River Valley: preliminary presentation

County of San Diego / ECOnorthwest | September 15, 2026.

Original 19-page presentation hosted by a local publisher; slides 13 and 16 visually reviewed. Model scenarios are not audited realized damages.

R32 Capture and Cleanup Initiative: board letter

County of San Diego | September 1, 2026.

Original county document hosted by a local publisher. Planning phases are distinct from construction approval.

R33 Tijuana River Capture and Cleanup Initiative: notice of exemption

California CEQAnet / County of San Diego | September 2, 2026; SCH 2026090099.

Documents $1.8 million feasibility/planning scope; not a permit for an operating treatment plant.

R34 Saturn Boulevard project: preconstruction activities

California CEQAnet / County of San Diego | September 2026; SCH 2026090100.

Documents $4 million for preconstruction/design/environmental work, not a completed permanent structure.

R35 2025 Tijuana River Valley Water Quality Report: release and methods summary

San Diego Coastkeeper | September 10, 2026.

Original monitoring organization summary. The report concerns 2025 samples, not a live October 2026 river reading.

R36 Coastkeeper settles Tijuana sewage lawsuit

San Diego Coastkeeper | August 11, 2026.

Plaintiff organization account of settlement and transparency requirements; allegations are not treated as judicial findings.

R37 Tijuana River Valley: monitoring, complaints and air-purifier program

San Diego County Air Pollution Control District | Current program page consulted October 2, 2026.

Use current dashboard and guidance for conditions; this report did not extract a verified live reading for each neighborhood.

SOURCE REGISTER / CONTINUED

Sources & traceability

R38 Guide to Air Cleaners in the Home

U.S. EPA | Guidance consulted October 2, 2026.

Particle filtration and gas sorbents perform different tasks; no indoor cleaner guarantees complete protection.

R39 San Diego beach water quality status

County of San Diego | Live resource; consulted October 2, 2026.

Interactive beach status was not independently verified at the report cutoff. This is an action resource, not evidence of a particular beach being open.

R40 South Region environmental dashboard

County of San Diego | Live resource; consulted October 2, 2026.

Integrates monitoring and community information; embedded figures without a verified timestamp were not treated as current measurements.

R41 South Bay plant fact sheet

U.S. International Boundary and Water Commission | February 2025.

Dated funding and asset-condition snapshot; funding for one plant scope does not cover every watershed need.

R42 Historical Ecology of Tijuana Estuary and River Valley

San Francisco Estuary Institute | 2018 research presentation.

Historical restoration context, not a forecast of time required for present recovery.

R43 State Water Board funds extension of Tijuana River trash booms project

California State Water Resources Control Board | July 21, 2026.

Agency-reported debris capture and operating funds; trash removal is not a wastewater-disinfection result.

R44 Order No. R9-2026-0005: amendment of South Bay NPDES permit

San Diego Regional Water Quality Control Board | Adopted April 8, 2026.

Primary adopted order describing treatment configuration and changed monitoring and reporting requirements.

R45 Report of transboundary bypass flows into the Tijuana River

U.S. International Boundary and Water Commission | March 31, 2017.

Indexed report text reviewed; full PDF retrieval failed. Distinguishes initial spill estimates from later event-specific reconstruction and acknowledges unmeasured flows.

R46 Tijuana River Valley Sewage Treatment: archival chronology

Steve Schoenherr / South Bay Historical Society | Compilation captured September 20, 2022; historical newspaper records.

1934 and 1937 newspaper transcriptions, pp. 1-2, provide historical primary accounts through an archival compilation; original newspaper scans were not independently authenticated.