Desarrollo de una evaluación de riesgos a nivel estatal para los sistemas de aguas residuales de California.

RESUMEN DEL GRUPO ASESOR – REUNIÓN DE ENERO DE 2026

RESUMEN DE LA EVALUACIÓN DE RIESGOS

Se realizarán tres evaluaciones de riesgos independientes que abarcarán los tres tipos diferentes de instalaciones y sistemas que cumplen los criterios de inclusión para el WWNA, los cuales se han detallado exhaustivamente en el informe de la Fase 1 del WWNA. Estas evaluaciones abarcan: 1) instalaciones del Sistema Nacional de Eliminación de Descargas de Contaminantes (NPDES), 2) instalaciones con Requisitos de Descarga de Residuos (WDR) y 3) sistemas sujetos a la Orden General del Sistema de Alcantarillado Sanitario (SSSGO). Este resumen ejecutivo detalla los criterios utilizados para definir una instalación o sistema como de alto riesgo en el marco de WWNA.

Desarrollo de criterios de riesgo

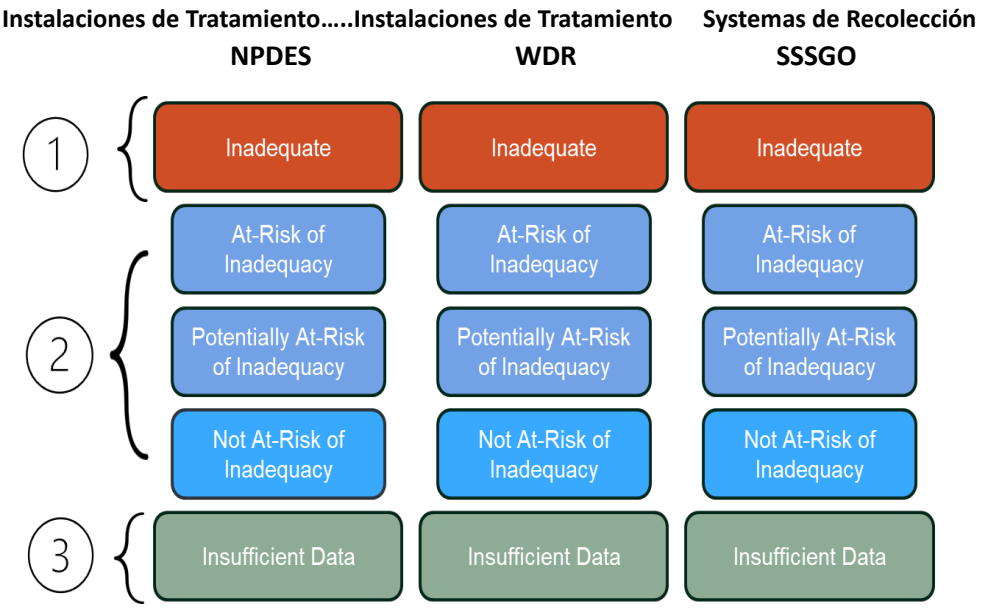
Comenzamos a desarrollar los Criterios de Riesgo a principios de 2024. En julio de 2024, creamos un Grupo de Trabajo compuesto por personal de las Juntas Estatales y Regionales del Agua para que, principalmente, contribuyera a definir los criterios de las Evaluaciones de Insuficiencia, pero también colaboraron en el desarrollo de los Criterios de Riesgo. Nos ayudaron a establecer los umbrales y las ponderaciones de las variables, además de evaluar si existe suficiente información para cada variable.

Hemos presentado también nuestros criterios de riesgo en tres reuniones del Grupo Asesor y en el Informe de la Fase 1 del WWNA, sobre los cuales solicitamos comentarios de los miembros del Grupo Asesor. Las “horas de oficina” del WWNA han sido otro espacio para que los miembros del Grupo Asesor compartan ideas y comentarios sobre criterios específicos, los cuales hemos hecho todo lo posible por incorporar en los criterios finalizados.

Descripción general de los criterios de riesgo

Existen cuatro categorías de criterios de riesgo: socioeconómica, operativa, ambiental y de salud pública. Cada categoría contiene un conjunto único de variables diseñadas para evaluar de manera integral el riesgo de inadecuación de una instalación o sistema. Se calculará un puntaje de riesgo general para cada instalación o sistema. El cuartil superior (percentil 75 o superior) será identificado como En Riesgo de Inadecuación. Aquellos que se encuentren en el percentil 50–75 serán identificados como Potencialmente en Riesgo, y todos los demás sistemas e instalaciones serán identificados como Actualmente No en Riesgo de Inadecuación.

Figura 1. Evaluaciones por Tipo de Instalación y Sistema



Si a una instalación o sistema le faltan datos para una o más variables de riesgo, dicha variable se omitirá para los fines de la primera WWNA. El cálculo del riesgo general seguirá realizándose con las variables de riesgo existentes, a menos que a una instalación o sistema le falten datos para múltiples variables de riesgo. Esta situación se evaluará caso por caso, y es possible que estas instalaciones o sistemas deban excluirse de la Evaluación de Riesgos e incluirse en una categoría de Datos Insuficientes. Se espera que futuras iteraciones de la WWNA podrán incluir información sobre la disponibilidad y la calidad de los datos para el proceso de Evaluación de Riesgos.

Análisis Espacial

Para aplicar variables de riesgo como la vulnerabilidad socioeconómica o al cambio climático a las instalaciones y sistemas, utilizaremos análisis GIS para construir perfiles a nivel de sistema de la población atendida por dicha instalación o sistema. Por ejemplo, utilizaremos datos demográficos y de ingresos de la Oficina del Censo de Estados Unidos para estimar la población atendida por cada sistema según el grupo racial/étnico o para identificar aquellos con altas proporciones de poblaciones históricamente marginadas. Estas características a nivel de sistema pueden asignarse, en su totalidad o con un esfuerzo adicional para diferenciarlas, a las instalaciones individuales de tratamiento de aguas residuales o a los límites del área de servicio de los sistemas. Para realizar este análisis espacial, nos basamos en los límites de las áreas de servicio del sistema de alcantarillado sanitario que las propias empresas gestoras presentan a la Junta Estatal del Agua. Para las instalaciones sujetas a los permisos NPDES y WDR que no tienen un área de servicio definida, utilizaremos los datos de latitud/longitud y la dirección postal disponibles en CIWQS para geolocalizar dichas instalaciones.

Variables de riesgo incluidas

La Tabla 1 detalla las variables de riesgo que se incluirán en la primera evaluación WWNA. Se consideraron otras variables de riesgo, pero finalmente se descartaron por diversas razones, descritas en el Capítulo D del Informe de la Fase 1 de WWNA.

Límites

Para desarrollar los límites de las variables de riesgo, consideramos investigaciones de la Evaluación de Necesidades de Agua Potable de California, instituciones académicas, otras agencias estatales de todo el país y los estándares de la EPA de EE. UU. Se obtuvieron pocos límites exactos de indicadores de riesgo a partir de estas fuentes adicionales, dadas las características específicas de los objetivos de la Evaluación de Necesidades de Agua Potable. Con mayor frecuencia, los límites se derivaron utilizando puntos de corte en la distribución de los datos, o a partir de recomendaciones directas del personal de las Juntas de Agua. Se desarrollaron límites por niveles para capturar distintos grados de riesgo dentro de las variables.

Puntajes

Para permitir la evaluación y comparación de los indicadores de riesgo, se aplicará una puntuación estandarizada entre 0 y 1 a cada límite de la variable de riesgo. Esta puntuación normaliza el límite y permite que la evaluación de riesgos valore el rendimiento de las instalaciones y los sistemas en función de todas las variables de riesgo.

Ponderaciones

Se aplicarán ponderaciones de entre 1 y 3 a las variables de riesgo individuales, donde una ponderación de 3 indica el nivel más alto de criticidad. Las ponderaciones de las variables de riesgo individuales se elaboraron con la opinión de expertos del personal de las Juntas de Agua, los miembros del Grupo Asesor y nuestro equipo interno de WWNA.

Tabla 1. Límites, puntuaciones y ponderaciones de las variables de riesgo individuales.

Risk Category	Risk Indicator	Description	Applies to	Thresholds	Score	Weight	Max Score
Socioeconomic	Household Socioeconomic Burden (Poverty Prevalence)	Part 1 of composite socioeconomic burden indicator below. Percent of the population living below two times the federal poverty level.	NPDES, WDR, SSSGO	<20%	0	2	0
				20%-35%	0.125		0.25
				> 35%	0.5		1
	Household Socioeconomic Burden (Housing Burden)	Part 2 of composite socioeconomic burden indicator below. Percent of households that are both low income (making <80% of the Housing and Urban Development (HUD) Area Median Family Income) and severely burdened by housing costs (paying >50% of their income to housing costs).	NPDES, WDR, SSSGO	<14%	0	2	0
				14%-21%	0.125		0.25
				>21%	0.5		1
	Household Socioeconomic Burden (Combined)	Measures household poverty prevalence and housing burden using a composite score. Communities with high levels of poverty and high housing costs may struggle more to pay for the necessary upgrades, maintenance, and operation of wastewater facilities and systems.	NPDES, WDR, SSSGO	0-0.125	0	2	0
				.25-.5	0.5		1
				.625-1	1		2
	Disadvantaged Community Status and Severely	Identifies when a community's median household income is at or below 80 percent of the statewide median		MHI > 80% of State MHI	0	2	0

Risk Category	Risk Indicator	Description	Applies to	Thresholds	Score	Weight	Max Score
	Disadvantaged Community Status	household income (MHI). SDAC- Identifies when a community's median household income is at or below 60 percent of the statewide MHI.	NPDES, WDR, SSSGO	MHI < 80% and > 60% of State MHI	0.5		1
				MHI < 60% of State MHI	1		2
	Race and ethnicity of community	The racial and ethnic makeup of the community served by a Wastewater System and Facility. Historically marginalized people and communities are disproportionately likely to be without access to safe water and sanitation.	NPDES, WDR, SSSGO	Population < 50% Non-Hispanic White	0	2	0
				Population > 50% Non-Hispanic White	1		2
Operational	Percent of system cleaned annually	Indicates insufficient system maintenance, increasing risk of system inefficiency or failure.	SSSGO	> 60% of system cleaned annually	0	2	0
				20 - 60% of system cleaned annually	0.5		1
				< 20% of systems cleaned annually	1		2
	Percent of system inspected annually with closed-circuit television (CCTV)	Indicates inadequate inspection practices, increasing the likelihood of undetected issues and reducing system reliability.	SSSGO	> 10% of system inspected	0	1	0
				< 10% of system inspected	1		2

Risk Category	Risk Indicator	Description	Applies to	Thresholds	Score	Weight	Max Score
	Relative System Capacity	The system's flow relative to population served. Indicates if the system is at-risk of backups or overflows.	SSSGO	<120 gal per capita per day I&I - average dry weather flow	0	3	0
				<275 gal per capita per day I&I - average wet weather flow	0		0
			SSSGO	>120 gal per capita per day I&I - average dry weather flow	1		3
				>275 gal per capita per day I&I - average wet weather flow	1		3
	Age of system	Older systems may be more likely to experience structural failures, capacity issues, and increased maintenance needs.	SSSGO	> 50% of system built after 1980	0	1	0
				> 50% of system built before 1980	0.5		0.5
				> 50% of system built before 1940	1		1
	System Governance Type	The legal entity that manages a wastewater facility or system.	NPDES, WDR, SSSGO	System owned publicly	0	1	0
				System owned privately	1		1
	Operator Certification	Measures if a certified operator is present at a wastewater treatment facility and, if so, if the certification	NPDES, WDR, SSSGO	Sufficient operator certification	0	3	0
				Insufficient operator certification	1		3

Risk Category	Risk Indicator	Description	Applies to	Thresholds	Score	Weight	Max Score
		present is sufficient for the wastewater facility or system.					
	Depopulation	Measures the population decline of areas served by a wastewater system and facility. A shrinking customer base can lead to difficulties covering fixed costs and necessary upgrades.	NPDES, WDR, SSSGO	Population decline of < 10% in 5-years	0	1	0
				Population decline of 10-15% in 5-years	0.5		0.5
				Population decline of > 15% in 5-years	1		1
	Population growth	The increase in the population served by a wastewater system and facility. Rapid population growth can lead to hydraulic overloading and operational constraints.	NPDES, WDR, SSSGO	Population growth of < 10% in 5-years	0	1	0
				Population growth of 10-15% in 5-years	0.5		0.5
				Population growth of > 15% in 5-years	1		1
	Population served by system	The total number of people served by a given wastewater treatment facility or collection system. Necessary volume and capacity estimates are a function of the population served by the system.	NPDES, WDR, SSSGO	Population served by systems > 2,500	0	1	0
				Population served by system < 2,500	1		1

Risk Category	Risk Indicator	Description	Applies to	Thresholds	Score	Weight	Max Score
	SSMP missing	Sanitary Sewer Management Plan missing not submitted for the last 6 years, or the submitted plan is from 6+ years ago.	SSSGO	SSMP submitted within the last 6 years, or existing plan is from last 6 years	0	1	0
				No SSMP submitted in the last 6 years, or existing plan is from 6+ years	1		1
	Effluent violation limits (WDR)	Builds upon WDR Inadequacy Criteria. Examples: If Inadequacy exceedance threshold is 20%, at-risk is 0–19%. If Inadequacy exceedance threshold is 40%, 20-39%. If Inadequacy exceedance threshold is 60%, at-risk is 40-59%.	WDR	System does not exceed the permit limit by up to 20% less than the established high-exceedance Inadequacy Criteria threshold in any 2 months within a 6-month period.	0	2	0
				System exceeds the permit limit by up to 20% less than the established high-exceedance Inadequacy Criteria threshold in any 2 months within a 6-month period.	1		2
	12-month and 5-year rolling average volume of spill/population	Builds upon SSSGO Inadequacy Criteria. Identifies systems in 50-75th percentile for both 12-year and 5-year rolling	SSSGO	<50th percentile for both 12-month and 5-year rolling average number of spills in system size groups	0	2	0

Risk Category	Risk Indicator	Description	Applies to	Thresholds	Score	Weight	Max Score
	served in size category	average volume of spill/population served.		50-75th percentile for both 12-month and 5-year rolling average number of spills in system size groups	1		2
	Average spill recovery rate	Spill recovery rate = Total spill volume / spill recovered	SSSGO	>50% average spill recovery rate	0	2	0
				50-10% average spill recovery rate	0.5		1
				<10% average spill recovery rate	1		2
	Near discharge exceedance - Limit Threshold	DMR effluent value approaching limit.	NPDES	Discharge value >20% below limit.	0	1	0
				Discharge value within 11-20% of limit.	0.5		0.5
				Discharge value within 10% of limit.	1		1

Risk Category	Risk Indicator	Description	Applies to	Thresholds	Score	Weight	Max Score
	Near discharge exceedance - Fraction Near Exceedance Threshold	The frequency of near-exceedance discharges.	NPDES	Facilities near limit exceedance <25% of discharges	0	1	0
				Facilities near limit exceedance 50-25% of discharges	0.5		0.5
				Facilities near limit exceedance >50% of discharges	1		1
	Near discharge exceedance - Slope Threshold	The minimum slope of measurements vs dates over the past 10 years.	NPDES	upward trend of <2.5% change in effluent exceedances over time	0	1	0
				upward trend of 2.5-<5% change in effluent exceedances over time	0.5		0.5
				upward trend of ≥5% change in effluent exceedances over time	1		1
	Combined near-exceedance and slope threshold	Identifies facilities that have had an upward trend of exceedance or near-exceedance over the past 10 years.	NPDES	Facility potentially at-risk or not at-risk for both or either near-exceedance limit threshold and slope threshold	0	2	0
				Facility at-risk for both near-exceedance limit threshold and slope threshold	1		2

Risk Category	Risk Indicator	Description	Applies to	Thresholds	Score	Weight	Max Score
Environmental	Future permit additions due to discharge to impaired waterbody	Identifies facilities discharging to waterbody added to the California Integrated Report in the past 5 years for a pollutant the facility does not currently have a limit.	NPDES	Facility not discharging to waterbody on 303(d) list	0	2	0
				Facility discharging to 303(d) waterbody and does not have a limit for regulated pollutant	1		2
	Drought	Drought impacts and associated conservation measures contribute to lower indoor water usage. Declining indoor water flows can pose risk to wastewater facilities and systems. Projected average daily precipitation during an extended drought scenario from 2023–2042.	NPDES, WDR, SSSGO	>75th percentile	0	1	0
				75-10th percentile	0.5		0.5
				<10th percentile	1		1
	Sea Level Rise	For coastal wastewater facilities or systems, sea level rise can cause flooding or block system outflows, among other negative system impacts. Projected sea level rise zone under a flood scenario in 2030.	NPDES, WDR, SSSGO	Not within projected sea level rise zone	0	1	0
				Within projected sea level rise zone during under a 50m scale median flood scenario.	0.5		0.5
				Within projected sea level rise zone during under a 2m scale median flood scenario.	1		1

Risk Category	Risk Indicator	Description	Applies to	Thresholds	Score	Weight	Max Score
	Extreme Precipitation	Very high precipitation levels can increase influent levels past the acute or chronic capacity of a wastewater facility or system. Projected extreme precipitation days in which daily precipitation exceeds ≥20mm in year 2030 under standard emissions (RCP 4.5) scenario.	NPDES, WDR, SSSGO	1 or 0 extreme precipitation events per year in which the 2-day rainfall total is above an extreme threshold of 1 inch	0	2	0
				2-5 extreme precipitation events per	0.5		1
				>5 extreme precipitation events per year in which the 2-day rainfall total is above an extreme threshold of 1 in	1		2
	Flooding	Flooding can lead to wastewater infrastructure damage and forced treatment bypass. Projected flood zone during a 100-year storm and projected 1.0m of Sea Level Rise in year 2030.	NPDES, WDR, SSSGO	<.5m inundation depth during a likely 100-year storm and 1.0m Sea Level Rise projection	0	2	0
				0.5-4m inundation depth during a likely 100-year storm and 1.0m Sea level Rise projection	0.5		1
				>4m inundation depth during a likely 100-year storm and 1.0m Sea Level Rise projection	1		2
	Extreme Heat	Extreme heat events can impact wastewater facilities or systems' ability		<10 extreme heat days day per year	0	1	0

Risk Category	Risk Indicator	Description	Applies to	Thresholds	Score	Weight	Max Score
		to effectively and efficiently remove contaminants. Projected extreme heat days are considered days above the 98th percentile of daily maximum temperatures in year 2030 under standard emissions (RCP 4.5) scenario.	NPDES, WDR, SSSGO	10-20 extreme heat days day per year	0.5		0.5
				>20 extreme heat days day per year	1		1
	Wildfire	Wildfires can damage wastewater infrastructure and change flow levels. Projected yearly wildfire burn area in year 2030 using a "business as usual" climate change model and standard population growth scenario.	NPDES, WDR, SSSGO	<15-hectare ft modeled annual area burned under medium emissions scenario and central population growth scenario	0	1	0
				15–60-hectare ft modeled annual area burned under medium emissions scenario and central population growth scenario	0.5		0.5
				>60-hectare ft modeled annual area burned under medium emissions scenario and central population growth scenario	1		1

*note the Constituents of Emerging Concern variable has been removed from the Risk Assessment by recommendation of the Water Boards because of insufficient information currently available across all systems regulated by the Regional Water Boards to assign thresholds, scores, or weights to determine if a facility is "at-risk" due to CECs.