

Update on Water Board Cleanup Programs, and VI

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CUPA Conference March 2023

Cleanup Programs Update

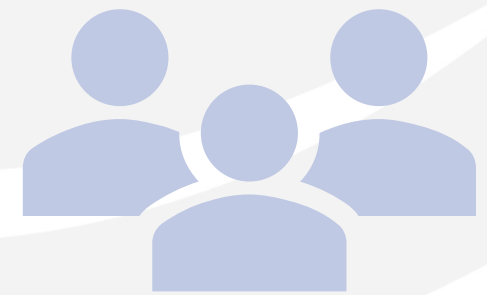
- Equity and Environmental Justice in Site Cleanup
- Climate Change Considerations for Site Cleanup
- Final Draft Supplemental Vapor Intrusion Guidance – What's Changed
- Empirical databases for Attenuation Factors
- Water Board Vapor Intrusion Policy

Equity and Environmental Justice in Site Cleanup



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Our Racial Equity Journey



**GARE and CalEPA
Advancing Racial
Equity Team**

- In 2018, Water Boards join the Government Alliance on Race and Equity (GARE)

**Water Boards'
Racial Equity
Team**

- The Water Boards' Racial Equity Team was convened in 2020

**Racial Equity
Resolution
Development**

- Development included public listening sessions in November and December of 2020

Our Racial Equity Journey



State Water Board Resolution No. 2021-0050

- Adopted November 16, 2021




Racial Equity Action Plan Development

- Began in Spring 2022
- Internal & External Workshops
- Tribal Consultations



January 2023 Racial Equity Action Plan



State Water Board's Racial Equity Vision

The Water Boards envision a California where:

- Race no longer predicts the access to, or quality of, water resources;
- Water Boards employees at all organizational levels reflect the racial and ethnic diversity of California; and
- A racial equity lens is consistently applied to Water Boards' decision-making processes.

Excerpts from the Action Plan

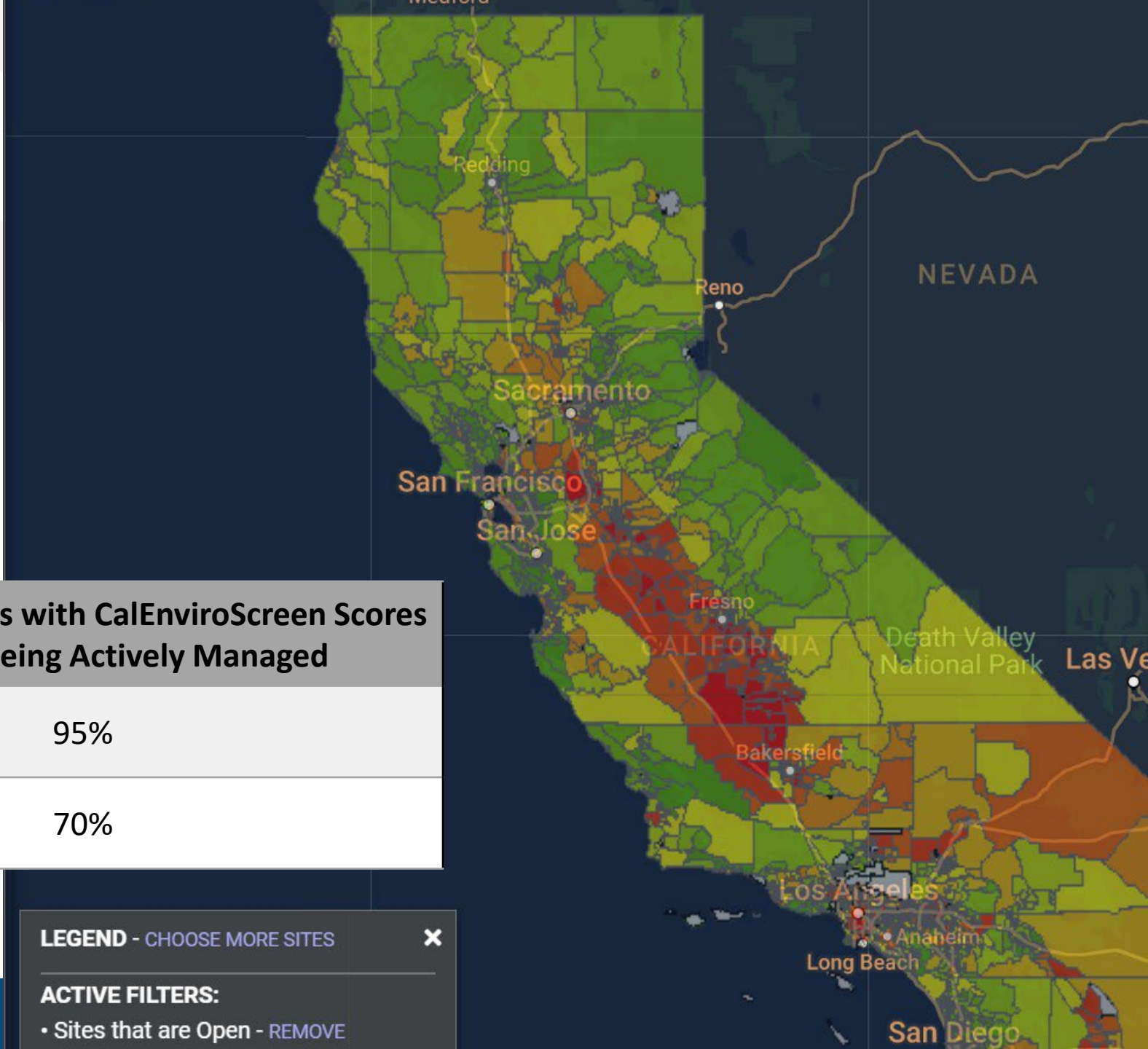
Pilot the racial equity toolkit to identify program-specific actions, priorities, and metrics, and realign programs and practices to advance racial equity, and assess the effectiveness of programs.

- Desired outcomes and accountability metrics are developed using results-based accountability approach for each DWQ program

Results-Based Accountability Tool

- What is the desired result?
- What would the result look like?
- What are the community indicators that would measure the desired result?
- What do the data tell us?
- Who are our partners?
- What works to change the data trend towards racial equity?
- What actions would you start with?

Environmental Justice Opportunities

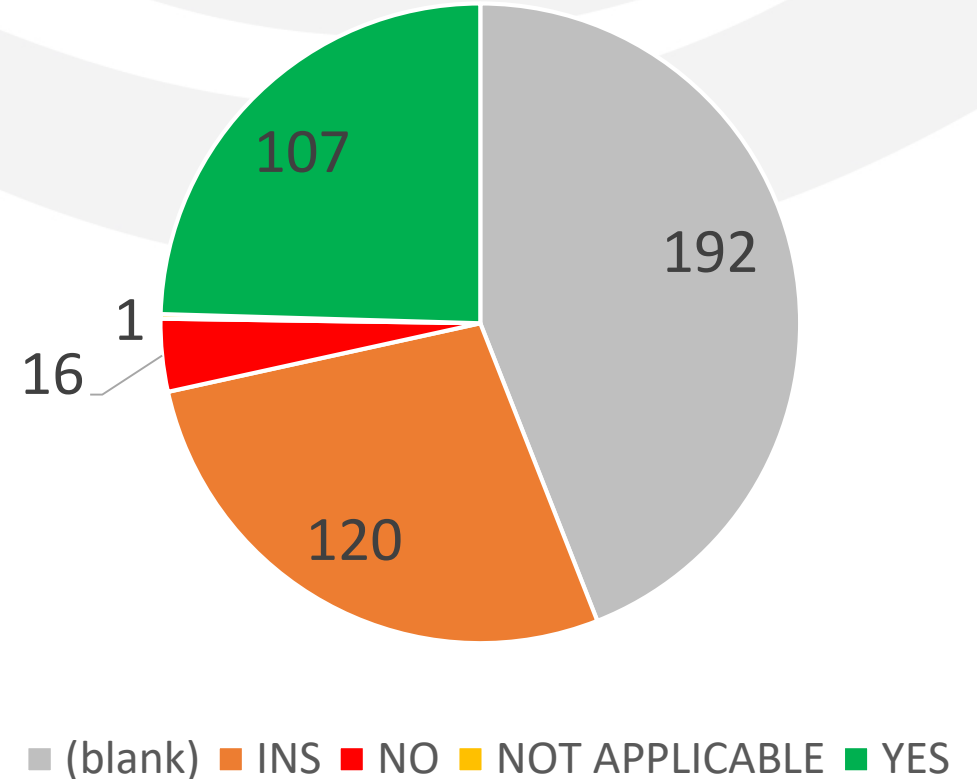
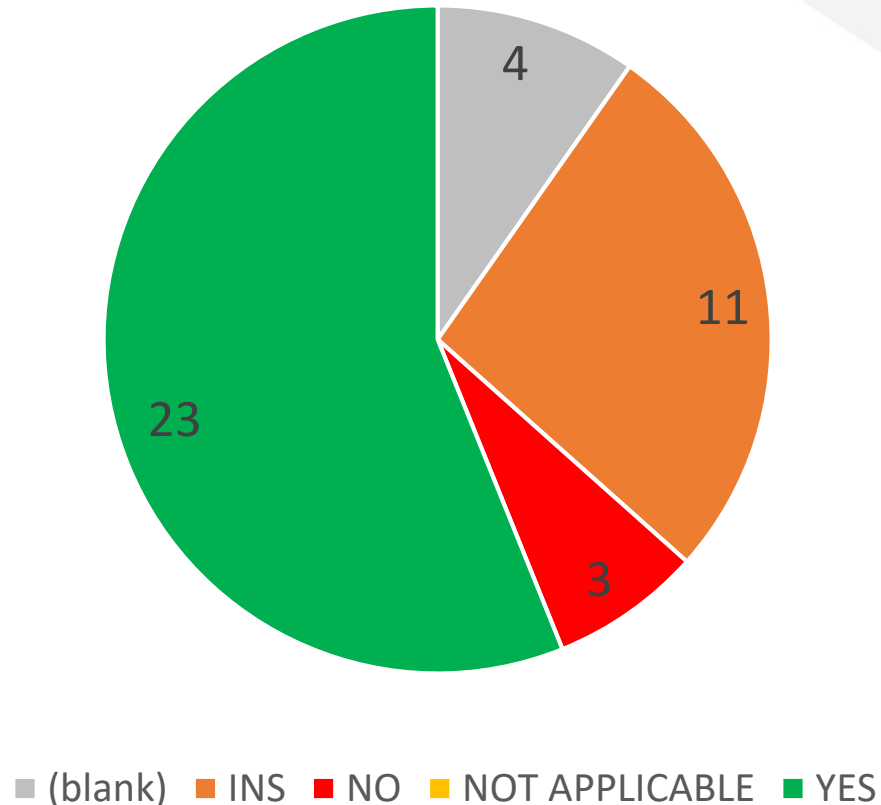


Program	Percentage of Sites with CalEnviroScreen Scores Above 75 Being Actively Managed
UST Cleanup Program	95%
Site Cleanup Program	70%

In EJ communities, there are more cases and a lower proportion of controlled risks

0-5% (lowest scores) - Sept 2022

95-100% (highest scores) - Sept 2022



Cleanup Programs looking forward

- Brainstorm & develop metrics
- Look at the Cal Enviroscreen scores for your cases
- Build our understanding of the communities impacted, and identify interested parties
- Consider more active case management in most vulnerable communities

Climate Change Considerations for Site Cleanup



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Agency-wide Climate Change Actions

- State Inter-agency Climate
 - Climate Adaptation Strategy 2021
 - Sea Level Rise Action Plan 2022
- State Water Board Climate
 - Climate Resolution 2007
 - Climate Resolution 2017
 - Regulatory requirements to reduce infrastructure vulnerability
 - Water quality permitting requirements
- State Water Board Strategic Work Plan
 - Increase statewide water resiliency



STATE WATER RESOURCES CONTROL BOARD
RESOLUTION NO. 2017-0012
COMPREHENSIVE RESPONSE TO CLIMATE CHANGE

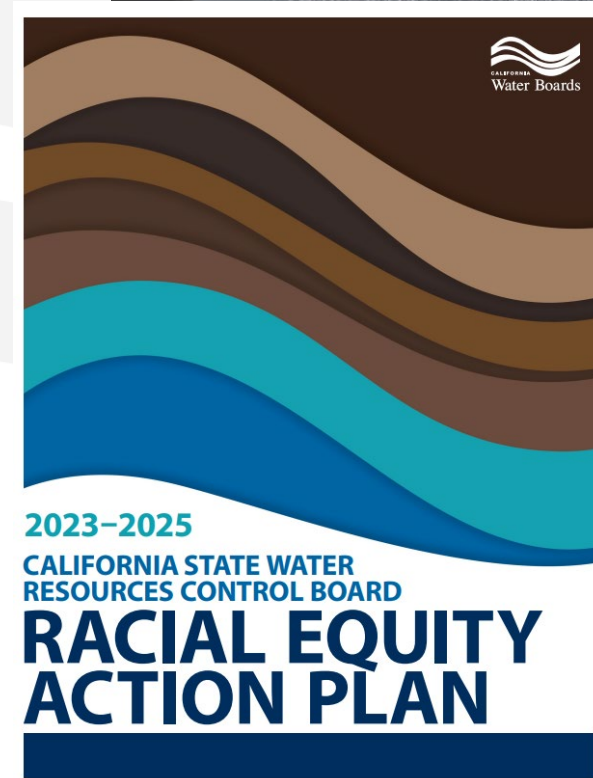
WHEREAS:

1. Sharp rises in the atmospheric concentration of greenhouse gases over the last century and a half, due to human activity, have led to an increase in global average temperature, and associated climate change.
2. Climate change is affecting and will affect different regions in different ways. Current and future impacts include increasing frequency of extreme weather events, prolonged fire seasons with larger and more intense fires, increased tree mortality, heat waves, sea-level rise and storm surges. Changes in hydrology include declining snowpack and more frequent and longer droughts, more frequent and more severe flooding, changes in the timing and volume of peak runoff, and consequent impacts on water quality and water availability. Vulnerabilities of water resources include, but are not limited to, changes to water supplies, subsidence, increased amounts of water pollution, erosion, flooding, and related risks to water and wastewater infrastructure and operations, degradation of watersheds, alteration of aquatic ecosystems and loss of habitat, multiple impacts in coastal areas, and ocean acidification.

Examples of water quality impacts include, but are not limited to: dry periods and drought lowering stream flow and reducing dilution of pollutant discharges, harmful algal blooms due to a combination of warm waters, reduced ability of warm water to hold dissolved oxygen, and nutrient pollution, more erosion and sedimentation caused by intense rainfall events, especially following wildfire, and increased velocity of stream flow, potential sewer overflows due to more intense precipitation and increased storm water runoff, rising sea levels inundating lowlands, displacing wetlands, and altering tidal ranges, and increasing areas subject to saltwater intrusion into groundwater, and water pollution and increased absorption of carbon dioxide creating coastal zone "hotspots" of acidification and hypoxia.
3. The risks of abrupt or irreversible changes increase as the magnitude of the warming increases. The [Intergovernmental Panel on Climate Change in its Fifth Assessment Report](#) indicates that limiting global average temperature increases to below 2 degrees Celsius is necessary in order to minimize the most catastrophic climate disruptions. The [California Climate Change Assessments](#) have provided a strong foundation of research addressing the impacts of climate change on the state, as well as potential response strategies.
4. Mitigation, in the context of climate change, refers to actions taken to reduce concentration of greenhouse gases in the atmosphere. The most effective way to reduce greenhouse gas concentrations in the atmosphere is to reduce emission sources.

Agency-wide Climate Change Actions

- Environmental Justice and Racial Equity
 - Example: Safe and Affordable Funding for Equity and Resilience (SAFER) program
- Racial Equity Resolution 2021
[State Water Board] Commits to expanding implementation of the State Water Board's Climate Change Resolution to address the disproportionate effects of extreme hydrologic conditions and sea-level rise on Black, Indigenous, and people of color communities
- Racial Equity Action Plan 2023 – commits to identify how climate change may impact communities



What are the Impacts?

- Inundation from sea level rise and flooding
- Groundwater rise
- Drought – changed regional pumping and infiltration
- Wildfires



Coordination Among Water Board Regulatory Programs

Regulatory decisions must consider sea level rise impacts on:

- Coastal waters and bays
- Inland Delta waters and wetlands
- Other ecosystems



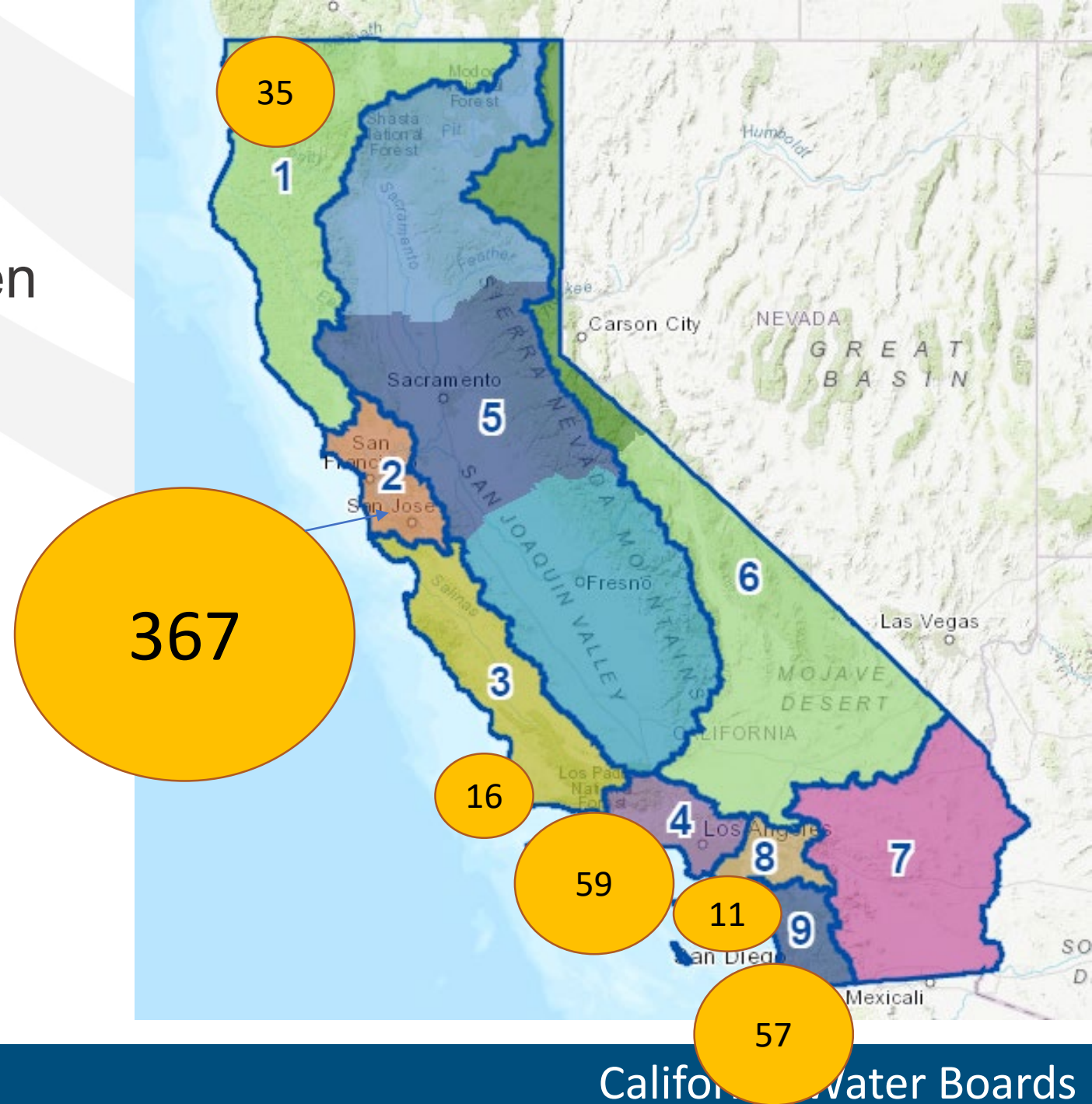
Climate Change-driven Programs Impacting Each Other

- Clean-up sites and Underground Tanks
- Sustainable Groundwater Management Act (SGMA) Program
- Water Supply-related
 - Water Conservation
 - Stormwater Capture and Water Recycling
- Coastal and Watershed Protection
 - Wetlands, streams, habitats



GIS Evaluation for Cleanup Programs

- Map shows total number of open and closed site cleanup cases inundated by 5 feet of sea level rise.
- All coastal regions impacted; inland impacts not captured by this model.
- San Francisco Bay Region has the greatest number of sites potentially impacted.



State Water Board Plans

Proposed update to Site Cleanup Policy

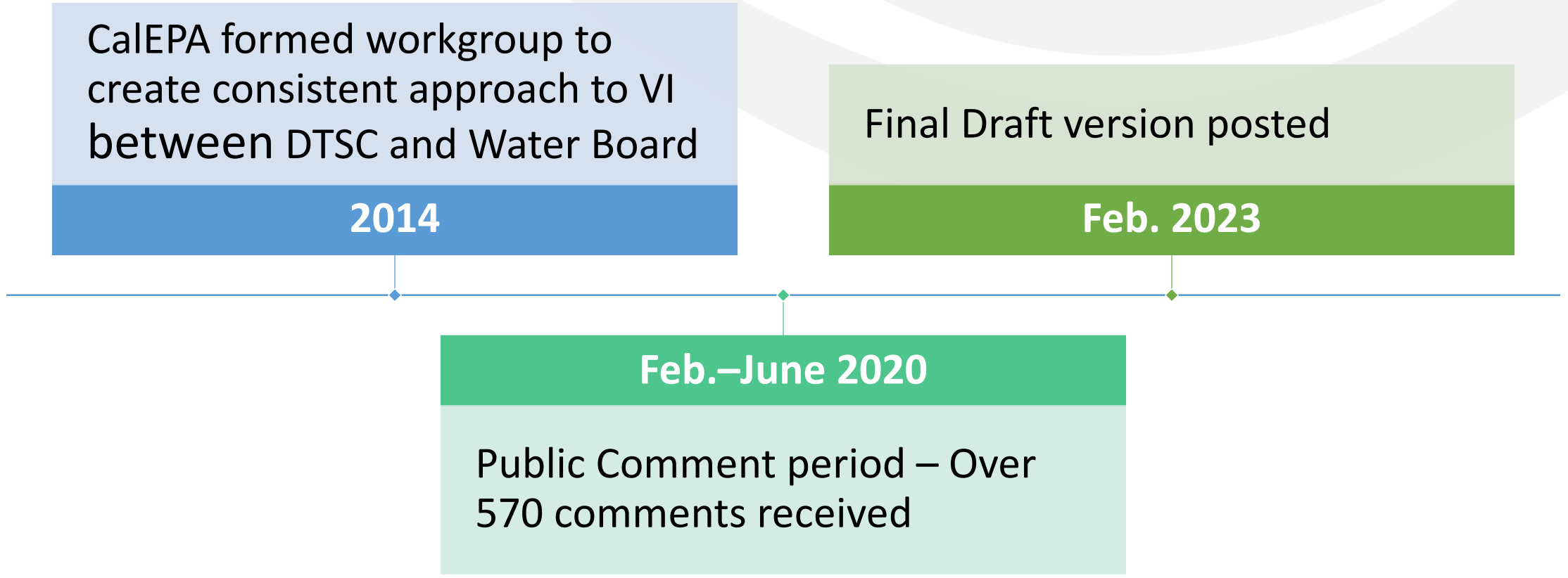
- Primarily focus of update is vapor intrusion
- Substitute Environmental Document will include analysis of the Cleanup Program with regard to Climate Change
- Plan to refer to USEPA guidance for green technologies
- Plan to require vulnerability assessments and adaptation plans for sites likely to be impacted by inundation or groundwater rise
- Consider the possible climate change threats in the timeframe of the project and select or revise remedies to be resilient and include contingency plans, as needed

Final Draft Supplemental Vapor Intrusion Guidance – What's Changed

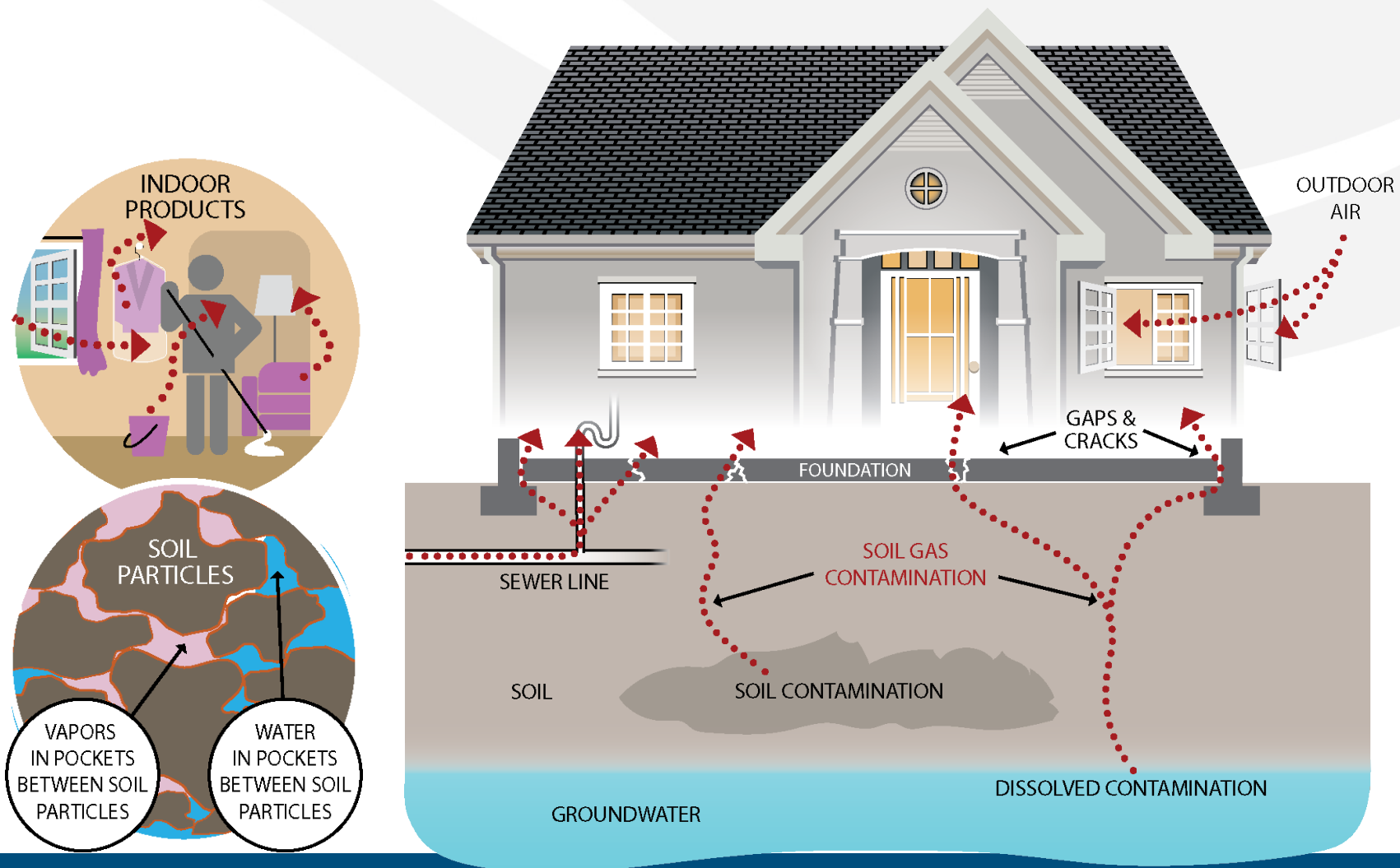


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Timeline



Vapor Intrusion Basics



Parts of the Guidance

- Final Draft Supplemental VI Guidance
- Plain language summary – English, Spanish, Vietnamese, and Korean
- Public Comments in tabular format
- Summary responses to Priority Tier 1, limited Priority Tier 2 Comments
- Updates to websites (DTSC & State Water Board)
- CalEPA VI workgroup will make themselves available for comments not responded to or not included in the guidance

Purpose of Supplemental Guidance



Improves vapor intrusion investigations



Helps to continue protecting public health



Promotes Statewide consistency

Step 1: Prioritize Buildings and Select Sampling Approach

Step 2: Screening with Soil Gas

Step 3: Indoor Air Investigation

Step 4: Risk Management Decisions

General Info



- What it does
 - Building specific vapor intrusion assessments
 - Addresses key data gaps missing in existing guidance (temporal & spatial variation)
 - Provides appropriate sampling process to help practitioners and regulators get important data for decision making
 - Promotes a consistent risk management framework by using USEPA's 0.03 attenuation factor for screening buildings
 - Allows alternative approaches to using US EPA's 0.03 attenuation factor when justified
- What it doesn't
 - Provide guidance for the overall site investigation for all media of concern
 - Apply to petroleum UST sites; but does offer guidance for other petroleum type releases

What is the Same as the Draft?

- **Early assessment** of VI risk to occupants of buildings
- **Expedited response action** for immediate threat to human health
- **Consistent sampling approach** to evaluate potential VI risk at a building
- Use of USEPA AFs for the **initial screening** of buildings
- **Building-specific dataset** needed for improved risk management decisions
- Assessment of **future VI risk** using subsurface data
- VI data collected **uploaded to GeoTracker** VI database
- **Public engagement early** and throughout the site investigation

What is revised in the Final Draft?

- Clarification:
 - use of the Supplemental Guidance (Introduction)
 - building prioritization (Step 1)
 - soil gas sampling depths (Step 2)
 - HVAC operation during indoor air sampling (Step 3)
 - alignment between the Petroleum-Specific Considerations Attachment (Attachment 2) with the State Water Board's Low-Threat Underground Storage Tank Case Closure Policy
- Addition:
 - post-screening approaches to refine current and future VI human health risk assessment (Step 4)
 - lines of evidence attachment (Attachment 1)

How to use guidance?

- Menu of tools – not requirements or regulations
- Represents current science
- Good technical approach
- Describes factors to consider in site specific decisions
- Provides options and describes when other approaches may be appropriate
- Not a prescriptive cookbook
- Need Policy for enforceable minimum requirements



What is a “Final Draft”?

- **Are you still receiving comments?** The public comment period was held from February 14 to June 1, 2020. This version was updated in response to the comments received and includes a response to comments.
- **Can we cite it even with draft in the title?** Yes, it is available for use and represents a consensus approach agreed to by DTSC, OEHHA, and the Water Board
- **Can you use other approaches?** Yes, alternate approaches should be justified, in many cases the guidance provides factors to consider when evaluating alternate approaches

Why stay with the 0.03 attenuation factor?

- Based on Federal USEPA Guidance (OSWER 2015)
- 24 of 28 states with guidance use AFs equal to or more conservative
- Based on our review of California databases 0.03 is reasonable for California for initial screening
- Provides protectiveness at most sites for unrestricted land use

Empirical databases for attenuation factors



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DTSC AF Study – December 2022



Total paired measurements – 4,972

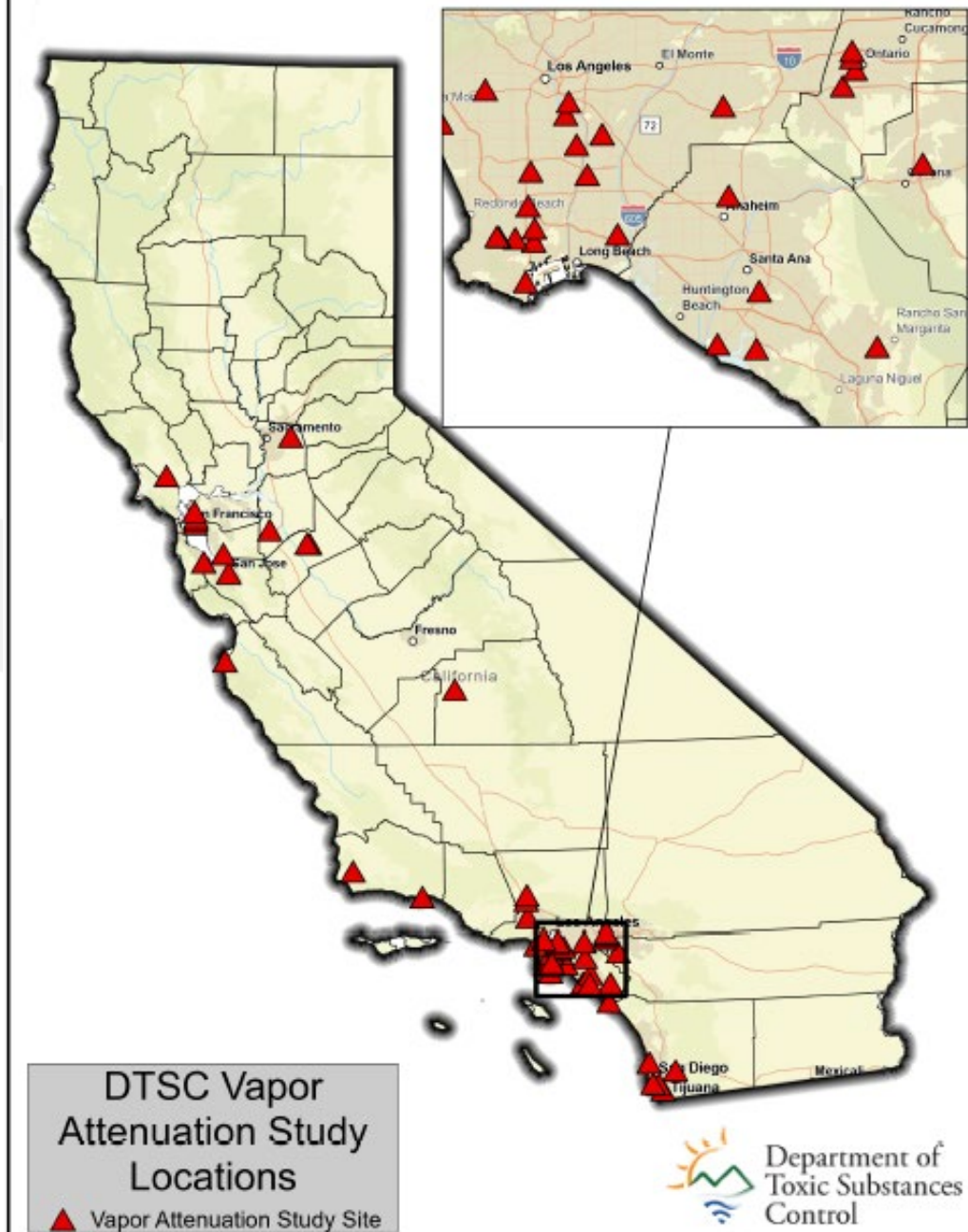
Sub-slab and Indoor air pairs -1196 (24%)

Soil gas and Indoor air pairs– 3,509 (71%)

Groundwater and Indoor air pairs– 267 (5%)

Geographical Distribution

- Total 52 sites
 - 31 in Southern California
 - 13 in Northern California
 - 2 in Central California
 - 6 in San Diego Area
- All residential data in Southern California



Limitations of USEPA & DTSC Databases

USEPA

- Few sites in California – our climate is different
- Mostly residential, not useful for industrial/commercial buildings
- Data is old and of unknown quality

DTSC


- Most data in Southern California, much of state not represented
- Mostly industrial/commercial, residential data from 3 sites in southern California.
- Still retrospective using old standards not addressing HVAC operation – especially of concern for non-residential buildings
- Not a sufficient basis for policy decisions at this time.

Compiled Dataset Advances AF Science

DTSC Attenuation Factor Study is an important first step.



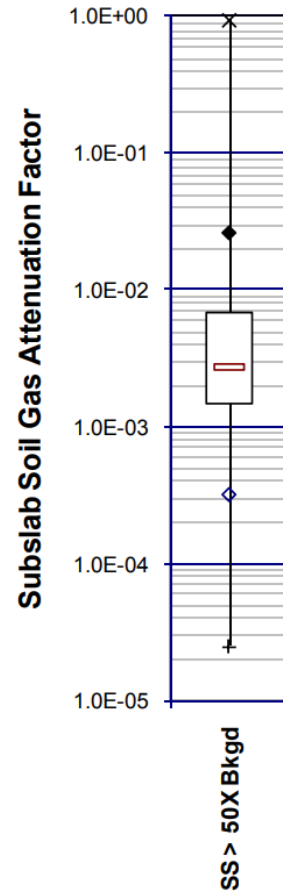
Large dataset that can be analyzed multiple ways.



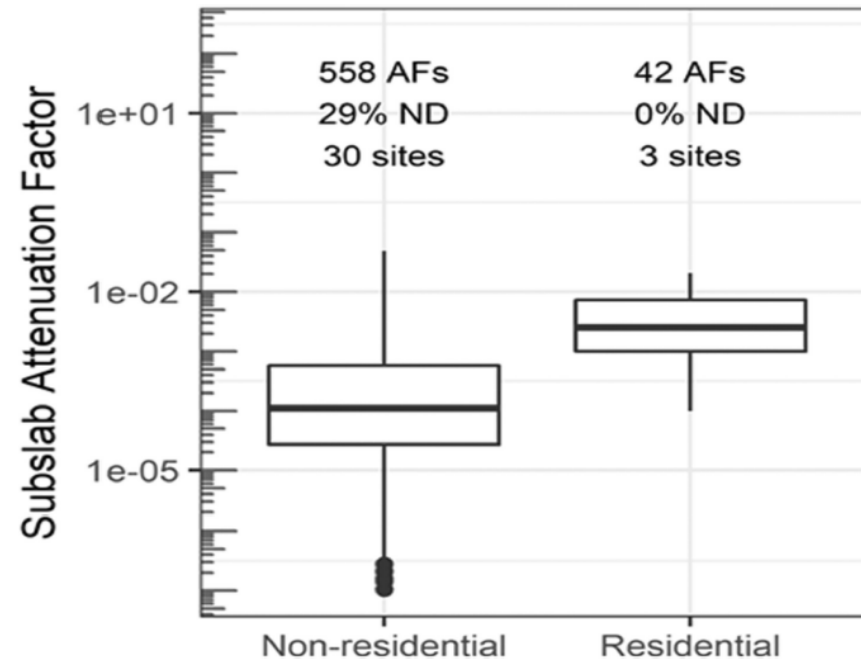
Water Board had opportunity to review raw data and run our own analysis.

How is an AF selected from a database?

USEPA Dataset

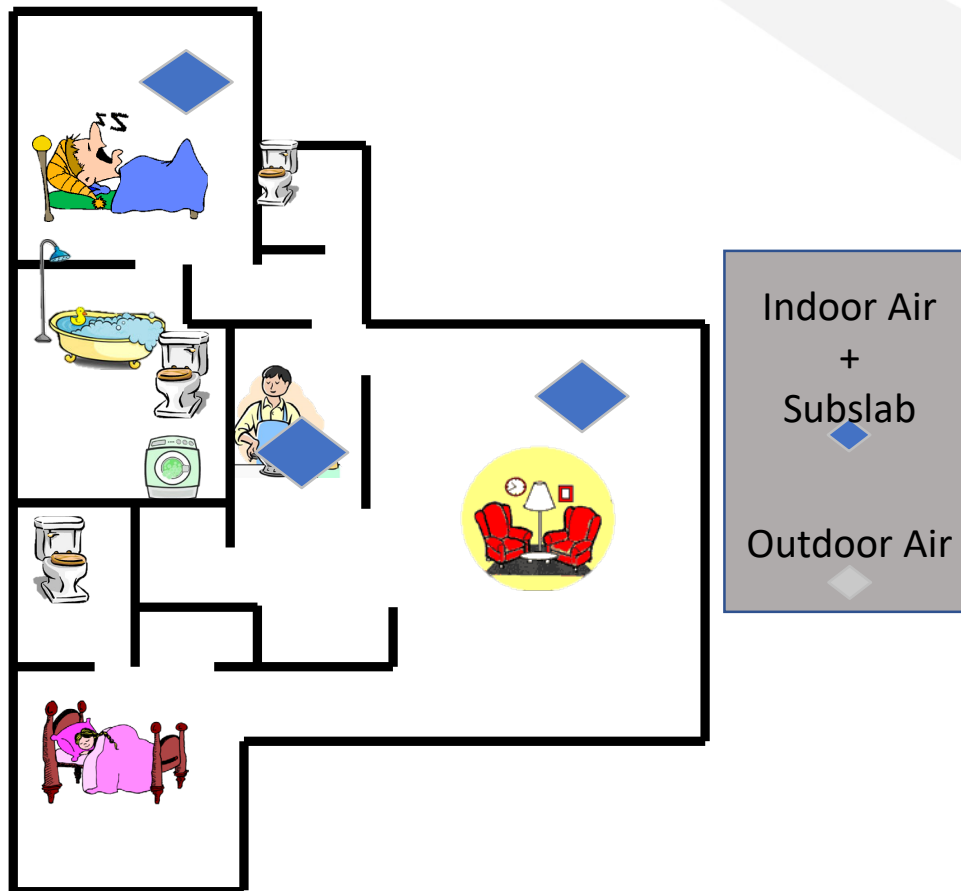


DTSC Dataset



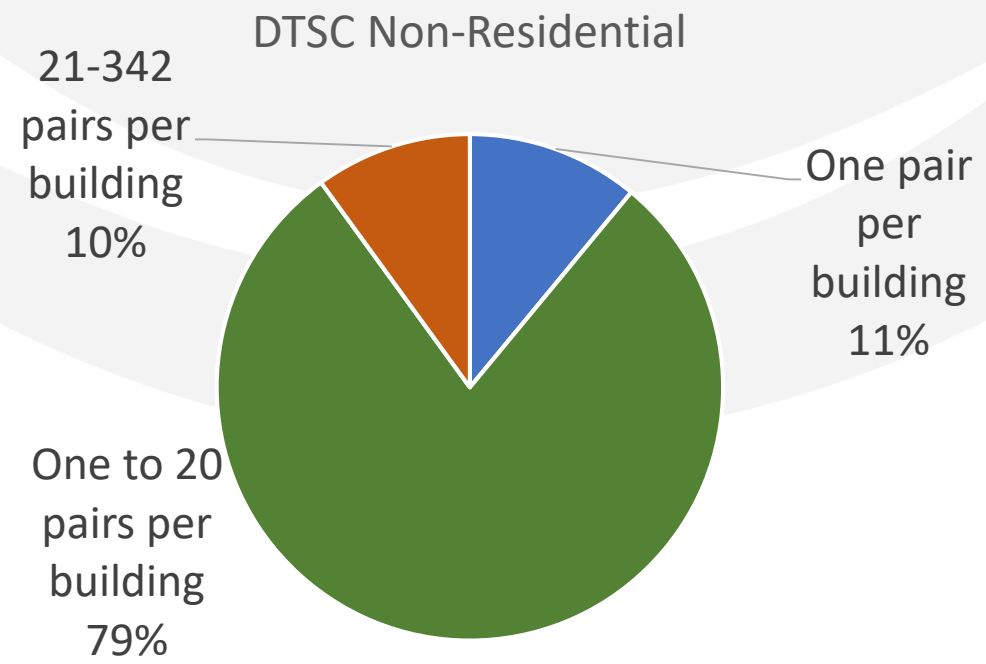
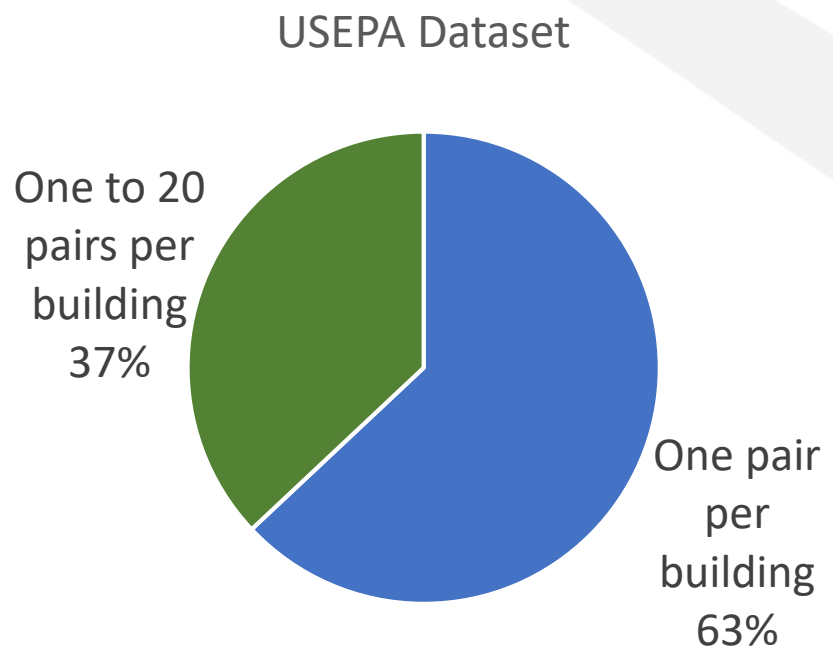
- Both USEPA and DTSC evaluate the distribution of the data and calculate the 95th percentile of data pairs
- Residential dataset is small, but not too different from USEPA's dataset

How many pairs come from one building?



- Older investigations may have only 1 pair for a small building
- Per the SVIG there would be three locations from this building, sampled two rounds plus additional round with HVAC off – 9 pairs
- Even more pairs for large non-residential buildings
- Do you include all pairs, or try to weight buildings equally?

Is each building given similar weight?



- Do the buildings with many data pairs bias the results of DTSC's dataset?

Subslab data by building or pair

DTSC Study Building vs Pairs Analysis for Subslab Data

Building Use	Water Board Building Analysis		Water Board Pairs Analysis	
	# Buildings	95th Percentile AF	# Pairs	95th Percentile AF
Res	15	0.02	42	0.02
Non-Res	67	0.02	558	0.003

Why do we see a difference for non-residential buildings, but not for residential?

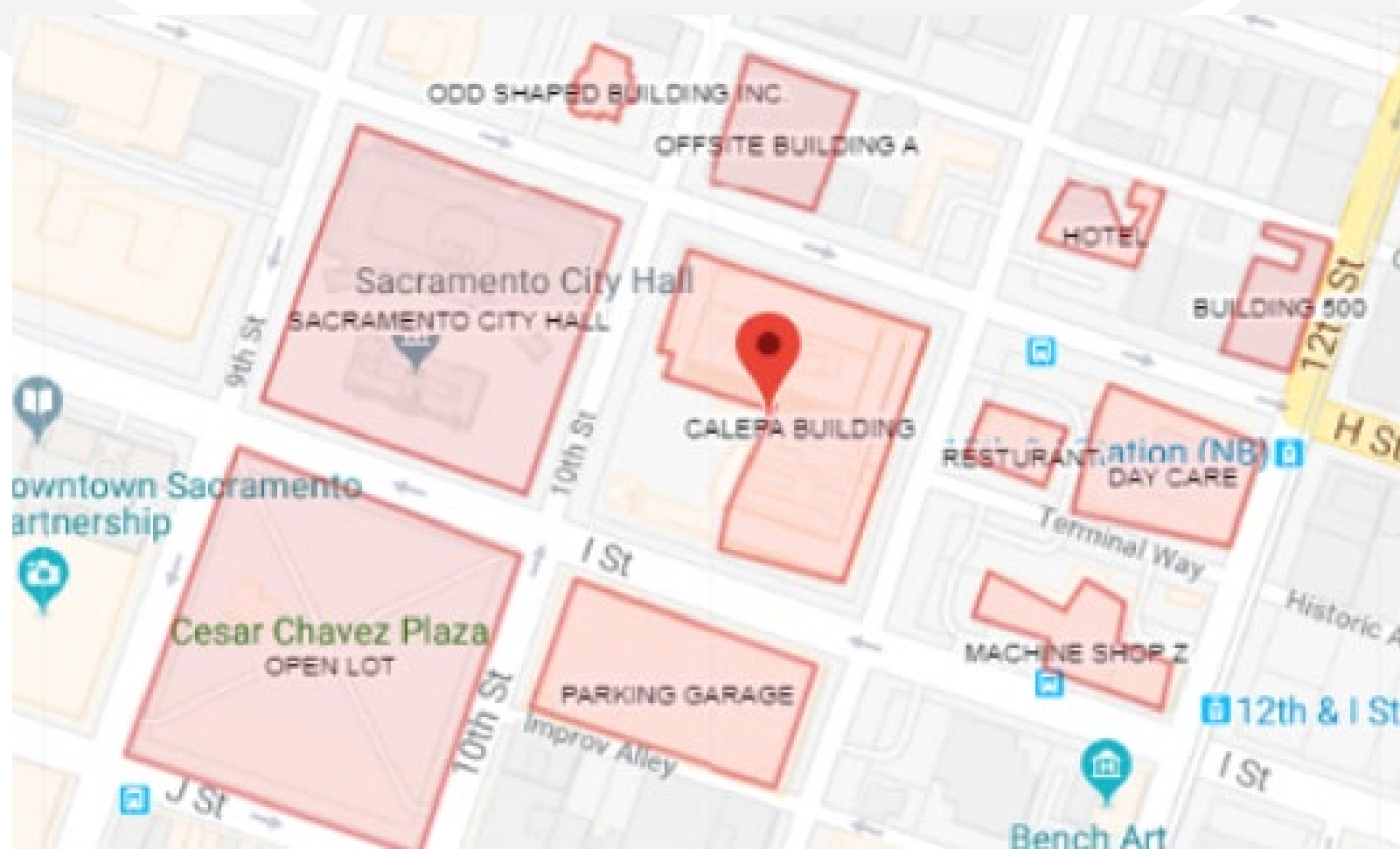
DTSC's Subslab Data: AF Analysis of Nonresidential Building Types

Building Type	Water Board Building Analysis		Water Board Pairs Analysis	
	# Buildings	95th Percentile AF	# Pairs	95th Percentile AF
Church	1	0.004	10	0.004
School	1	0.006	14	0.003
Shopping Plaza	25	0.03	116	0.01
Office Complex	11	0.02	68	0.003
Warehouse	19	0.007	167	0.001
Type Not Listed	11	0.008	176	0.0008

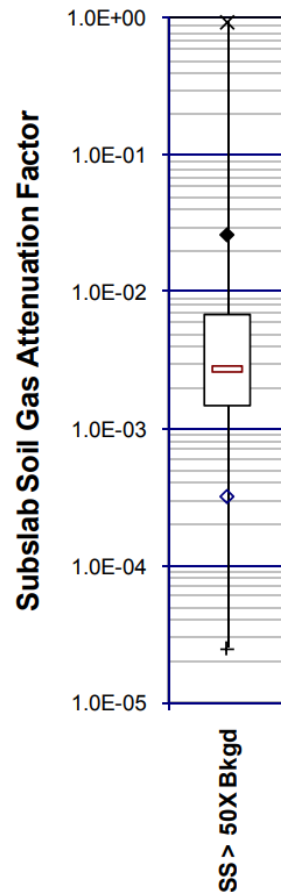
- Should we set policy based on this number of buildings?
- What number would be protective for a drycleaner site?

Next Steps for a California Database

- More data will allow analysis of more variables and reduce uncertainty
- Instructions and training available online
- https://www.waterboards.ca.gov/water_issues/programs/site_cleanup_program/vapor_intrusion/geotracker.html



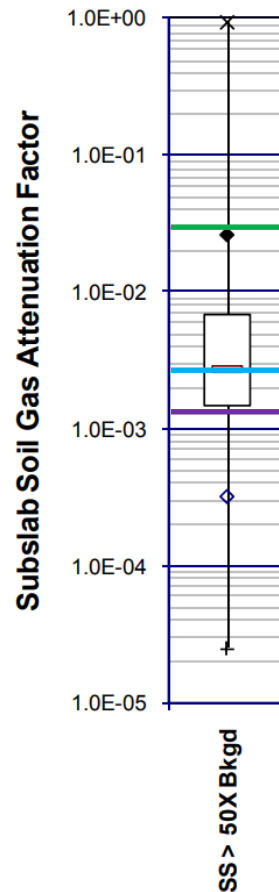
How to Select Building Specific AFs – one idea



- Concerns –
 - Measured AFs may not capture variability
 - AFs may change as buildings age
- Start with a database – this is subslab data from USEPA 2012
- Compare measured or modeled AFs to the range of AFs observed in the database to evaluate if the AFs are realistic
- Use lines of evidence to support selecting an AF from the empirical range

How to Select Building Specific AFs

– one idea

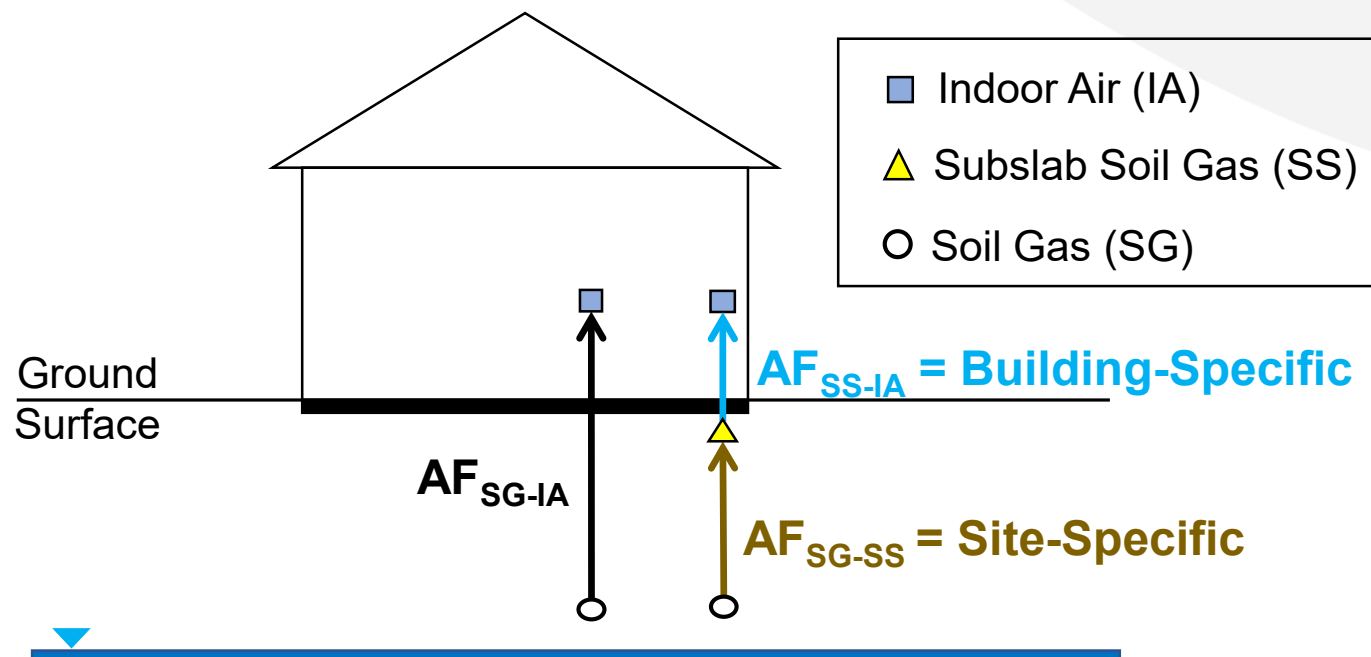


- **USEPA Default AF 0.03** – initial screening, especially when site characterization is ongoing
- **Median of USEPA Database AF 0.003** –
 - measured building specific AFs are less than 0.003, and
 - lines of evidence indicate this will be protective (e.g., new construction with plugs in any utility conduits)
- **25th percentile of USEPA Database AF 0.001** –
 - measured building specific AFs are less than 0.001, and
 - multiple lines of evidence indicate this will be protective (e.g., robust construction and ventilation, deed restriction requiring re-evaluation for future buildings)

How to Select Building Specific AFs

– one idea for deeper soil gas

$$(AF_{SG-IA}) = (AF_{SG-SS}) \times (AF_{SS-IA})$$



Site-Specific (Source to Slab, AF_{SG-SS})

- Multi-depth soil gas samples
- Computational models (e.g., J&E) then correct for AF_{SS-IA} . Verification sampling or monitoring.

Water Board Vapor Intrusion Policy



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Water Board Vapor Intrusion Policy Process

- Drafting Vapor Intrusion Policy, potentially as an amendment to State Board resolution 92-49 to establish requirements for VI assessments during site investigations and cleanup
 - Account for temporal & spatial variability
 - Propose use of USEPA's attenuation factors for the initial screening of buildings
 - Strengthen use of GeoTracker vapor intrusion ESI features
 - Consider climate change and sustainability
 - Support environmental justice & racial equality

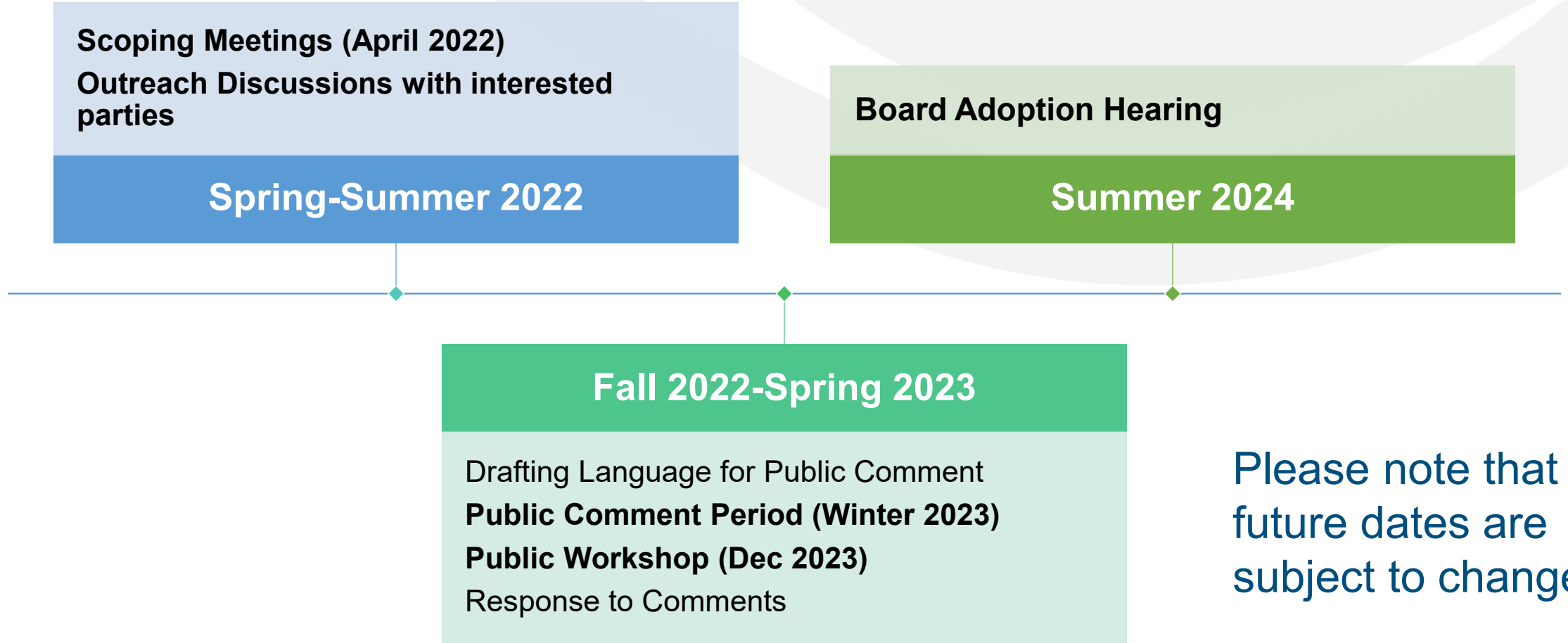
CEQA Scoping – Early Feedback

- USEPA's AF is too conservative
- Continue to coordinate with DTSC and use their database
- Consider if Resolution 92-49 is the right place – Keep in guidance or a separate policy
- Developers concerned that new approach makes brownfield redevelopment cost prohibitive
- Community representatives want conservative protective approach

New Sections of Draft Vapor Intrusion Policy

- Public Participation and Tribal Outreach
- GeoTracker Requirements
- Initial Screening of Buildings – similar to Supplemental VI Guidance
- Risk Assessment and Risk Management
- Feasibility and Remedy Selection – Includes sustainability and changing risks due to climate change
- Mitigation – Not detailed standards, expectations for planning, operations and maintenance and reports
- Vapor Intrusion Risk Based Closure Criteria
 - Narrative criteria, not a prescriptive standard

Water Board's Path Forward



Please note that all future dates are subject to change

Questions?

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Optional Extra Detail Slides

Introduction

Provides an overview of the guidance document, scope and use, summarizes recommended attenuation factors for screening of buildings, and summarizes each step/sections of the guidance

Generalized Public Comment	Revision
Clarify the scope and use of the document	The document is guidance (not binding policy). The scope is primarily for screening – not closure. Expanded to allow site specific adjustments after screening.
Clarify when the document should be used and when not	Added language & flow chart identifying primary use in initial investigation; and additional use at other phases of cleanup. <ul style="list-style-type: none"> • USTs – Use UST Policy Instead • Federal sites (RCRA, EPA Funded Brownfields) – Use OSWER 2015 instead

Introduction, continued

Generalized Public Comment	Revision
Contrasting comments: “too prescriptive” or “not prescriptive enough”	Maintained overall approach, added more language to highlight areas of flexibility.
USEPA’s Attenuation Factors are “appropriate” or “overly conservative”	In consultation, DTSC, Water Board, and OEHHA agree to retain the USEPA AFs for screening consistent with other states.

Step 1: Prioritize Buildings and Select Approach for VI Evaluation

Collect site background information, identify data quality objectives, prioritize buildings within 100 feet and decide if soil gas or indoor air sampling should be conducted first.

Generalized Public Comment	Revision
Clarify the use of 100-foot radius for screening	<ul style="list-style-type: none">• Added language to justify the 100-foot inclusion zone• Added language allowing a reduced separation distance for non-UST petroleum releases

Step 2: Evaluate Vapor Intrusion Risk Using Soil Gas Data

Collect soil gas sampling data to assess the nature, distribution, and extent of shallow soil gas contamination. Use this data to assess VI health risk and hazard for initial screening.

Generalized Public Comments	Revisions
What soil gas sampling depths are appropriate for assessing VI risk at open lots?	Moved recommendations for existing and future buildings to separate sections.
The slab capping effect is not observed at all sites, why are the recommendations for sampling depth based on it?	Clarify that using this assumption increases the probability that our process will be conservative and not underestimate VI risk.
How and when are lines of evidence (LOEs) used in Step 2?	New Attachment 1. Referred to LOEs in Step 2 text.
Can passive soil gas sampling methods be used?	Explain limitations of passive samples. They can be used to rule in but not rule out VI risk.

Step 3: Indoor Air Investigation

Conduct an in-depth building survey. Conduct a building-specific indoor air investigation under typical use conditions during at least two sampling events in different seasons. For one sampling event, additionally conduct sampling during non-typical use conditions (e.g. ventilation system off).

Generalized Public Comment	Revision
Conducting sampling with the ventilation system off can be uncomfortable or unsafe.	Revised to indicate sampling under this condition should only be conducted when safe and feasible. Other alternatives are mentioned.
The conceptual site model should be the primary tool to determine the appropriate number of samples for the indoor air investigation.	No change. The text already indicates the result of the building survey should be used to design the number and location of samples for the indoor air investigation.

Step 4: Current and Future Risk Evaluation and Risk Management Decisions

Guidance on making VI risk management decisions based on VI risk assessment and other lines of evidence. Expanded significantly in response to comments to provide information about site specific flexibility.

Generalized Public Comments	Revisions
Various concerns about SVIG recommending specific response actions based on risk and hazard calculated from initial VI screening evaluations.	Removed table linking risk/hazard levels with specific response actions. Added sections on refining the initial VI screening-based risk assessment.
How can site-specific data be used to inform risk management decisions, exit strategies, cleanup goals, and remedy selection?	Added discussion of how site-specific risk assessments and other lines of evidence can be used to inform risk management decisions.
What lines of evidence are used to assess future VI risk at vacant lots and redevelopment sites?	Discussion of future VI risk is separated into two different sections for existing and future buildings to clarify the differences.

Step 4: Continued

Generalized Public Comments	Revisions
Can site-specific inputs and average exposure concentrations be used in the health risk assessment?	Added guidance on the use of site-specific inputs and average concentrations.
Can toxicity criteria and screening levels from USEPA or other sources be used instead of those in the DTSC Tox Rule?	No revision. Follows DTSC's Tox Rule. See HHRA Notes 3, 10, and ESLs for criteria and screening levels.
<p>More information is needed in the guidance on:</p> <ul style="list-style-type: none"> a) the use of modeling to determine site-specific cleanup goals, and b) post-mitigation monitoring. 	<p>Added guidance on developing site-specific attenuation factors based on empirical data and fate and transport subsurface vapor modeling. Mitigation and post-mitigation monitoring plans requires more in-depth guidance. No revision.</p>

Attachment 1: Line of Evidence

New attachment to consolidate information about many other lines of evidence.

Generalized Public Comments	Revisions
Incorporate more Lines of Evidence into decision making	Compiled into the attachment, and expanded the discussion
How and when are lines of evidence (LOEs) used in Step 2 (soil gas screening)?	Discussed in the new attachment and referred to LOEs in Step 2 text.

Attachment 2: Petroleum-Specific Considerations

Provides two approaches for petroleum vapor intrusion screening accounting for biodegradation (setback distances and soil gas oxygen concentration) at non-UST petroleum release sites.

Generalized Public Comment	Revision
Revise to include the use of setback distance-based screening for petroleum	Revised to include setback distance-based screening consistent with the Low-Threat UST Case Closure Policy
Revise the soil gas screening approach to include use of the Low-Threat UST Case Closure Policy's bioattenuation factor	Revised to include the bioattenuation factor for soil gas concentration screening

Attachment 3: Sewers and Other Vapor Conduits as Preferential Pathways for Vapor Intrusion

Sewers should be evaluated during indoor air sampling as appropriate

Generalized Public Comment	Revision
Mention quantitatively how often sewers are a problem	Sewer VI occurs at 20% of dry cleaners in Denmark
Provide more information on when and how to sample	These sections have been expanded
A sewer AF should be provided for screening purposes	DoD sewer AF of 0.03 is recommended

Attachment 4: Groundwater as Line of Evidence to Evaluate VI Risk

Conversion of groundwater concentrations to equivalent soil gas concentrations and approached for screening

Generalized Public Comment	Guidance Revision
The SVIG should explicitly state when groundwater can be used to screen sites.	Groundwater can screen sites for further evaluation but cannot be a sole LOE for screening sites out.
A groundwater AF of 0.0005 should be recommended for fine-grained sites, consistent with USEPA	Done

Other Attachments

Attachment 5: GeoTracker Uploading Guidance

Attachment 6: Building Survey and Indoor Air Source Screen Forms