

# PCBs

## Recent Advances

In 2014 the RMP completed a report summarizing advances in understanding of PCBs in the Bay since the development of a control plan (the PCBs TMDL - SFBRWQCB [2008]).

New information obtained from RMP monitoring of small fish collected along the margins of the Bay in 2010 fundamentally altered our understanding of PCB contamination of the Bay food web and potential pathways of exposure for sensitive wildlife species such as birds and seals.

The data on PCBs in fish and sediment indicate that there are two broad habitat categories with food webs that are largely distinct: the margins and the open Bay. PCB concentrations in many areas on the margins are very high and persistent. The report presented a conceptual model update that shifted focus from the open Bay to the contaminated areas on the margins where impairment is greatest, where load reductions are being pursued, and where improvement in response to load reductions would be most apparent. The report concluded that these margin areas should be treated as discrete local-scale units for monitoring, forecasting, and management. Local-scale actions in upstream watersheds or in the margin areas themselves will be needed to reduce contamination within that area.

PCB inputs to the Bay from local watersheds are significant and a focus of management attention. Several watersheds have been identified as “high leverage” such that control actions may be a cost-effective way of reducing Bay impairment. Management measures are currently being evaluated by stormwater management agencies to address the load reduction requirements outlined in the PCBs TMDL. RMP studies over the next several years are being designed to track the effectiveness of these management measures in reducing concentrations in the Bay.

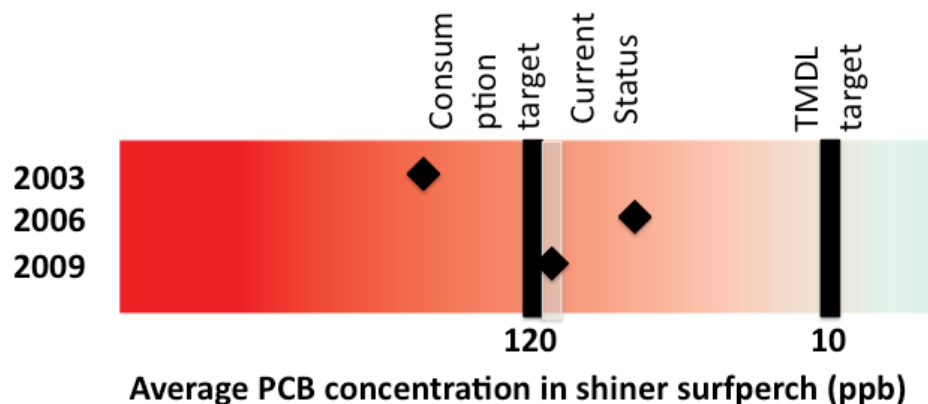
## State of the Estuary Indicator

Are Bay fish safe to eat?

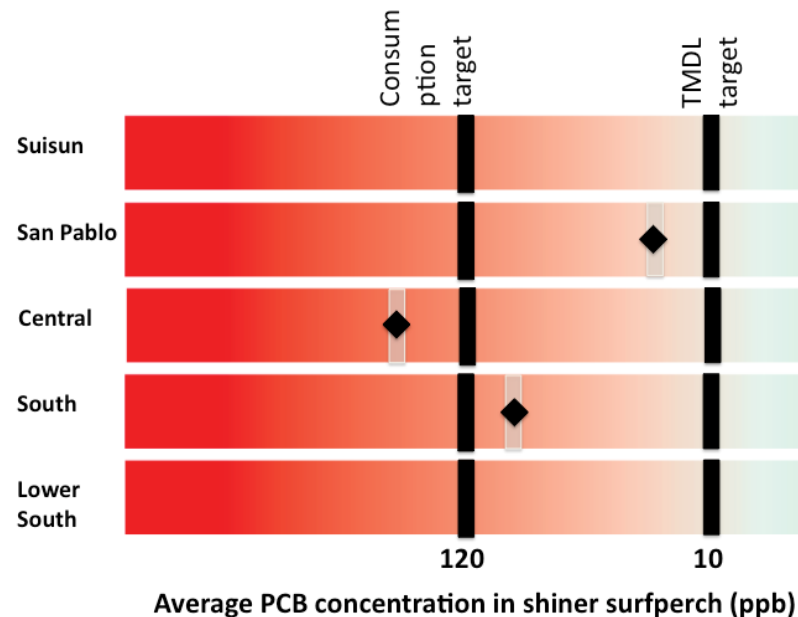
PCBs

### Progress Toward the Targets

PCB concentrations in sport fish should be less than 120 ppb to allow limited consumption, and less than 10 ppb to meet the cleanup target established by the TMDL.



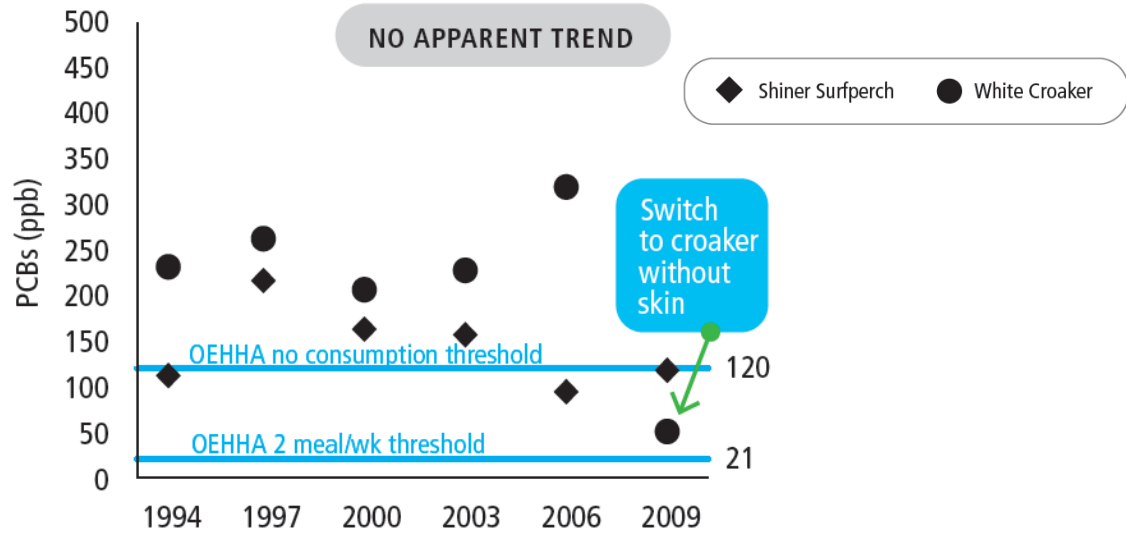
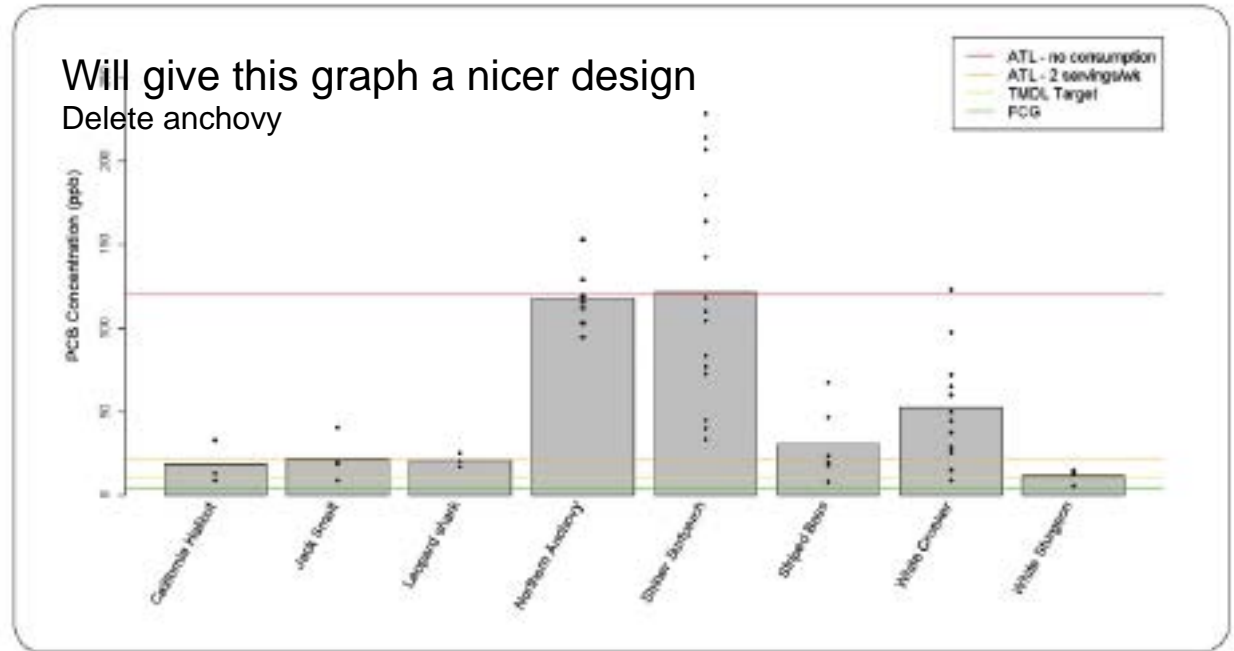
### Progress Toward the Targets By Segment



# Impairment

## Variation Among Species

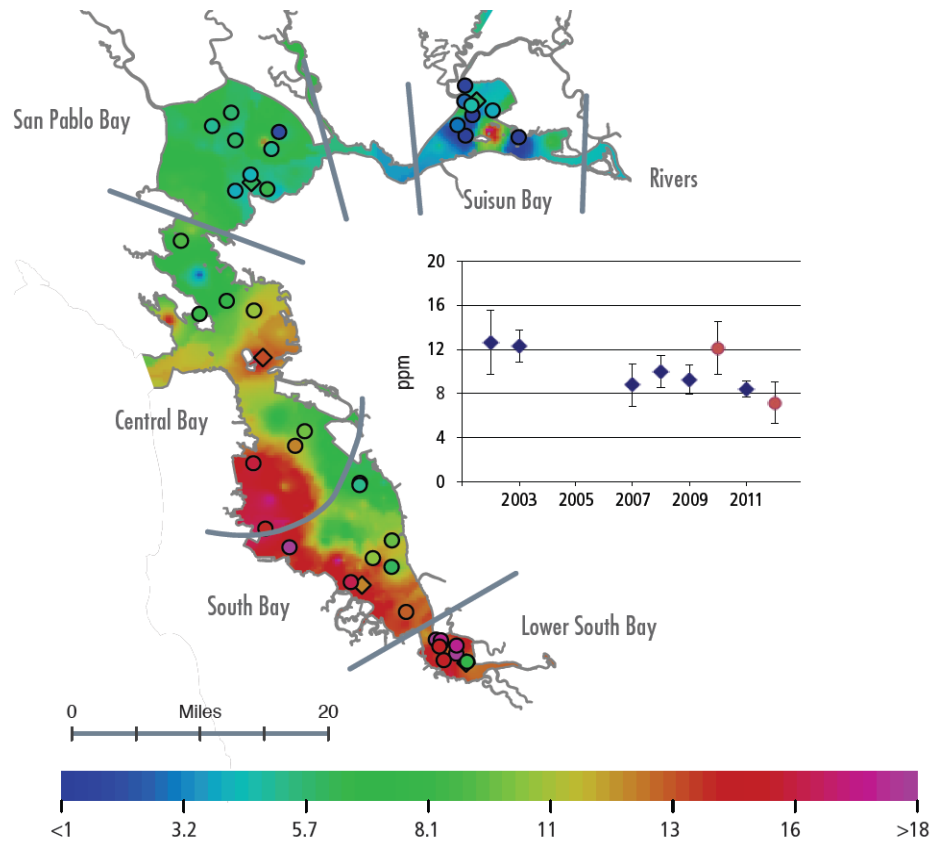
Concern for PCBs in the Bay is primarily driven by concentrations in sport fish. Shiner surfperch have the highest concentrations - 12 times higher than the cleanup target established in the TMDL. Because of the high concentrations in shiner surfperch, the Office of Environmental Health Hazard Assessment advises no consumption of any surfperch species in the Bay. All other sport fish species monitored also have average concentrations exceeding the TMDL target. There is also evidence of PCB exposure in birds, seals, and fish to a degree that may be reducing their health and survival.



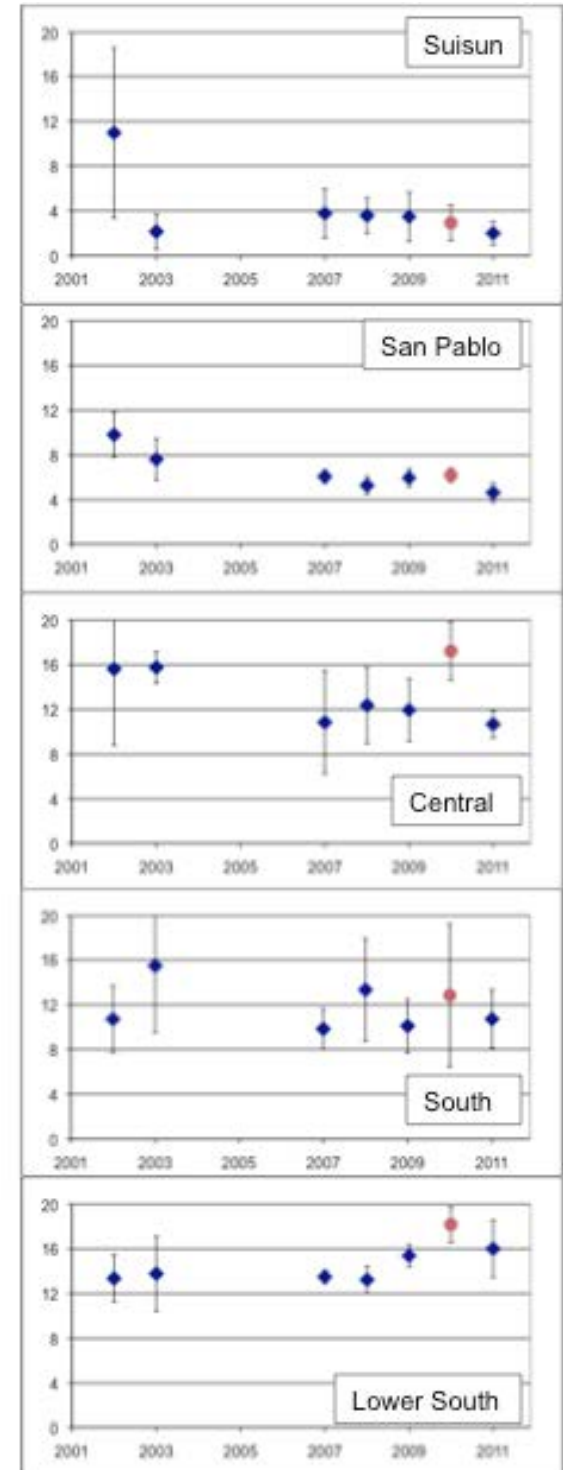
## Trends Over Time

PCB concentrations in shiner surfperch, a key indicator species in the TMDL, have shown little evidence of decline. The Bay-wide average shiner surfperch concentration was lower in 2009 than in 1997, but not significantly different from 2000, 2003, or 2006. Furthermore, the variation that has been seen over the five rounds of sampling was primarily due to variation in the fat content of the fish, and not due to declines in PCBs in the food web.

# Spatial and Temporal Patterns



Long-term average dry season PCB concentrations in Bay sediment have been highest in the southern reach of the Bay: Lower South Bay (14.2 ppb), South Bay (11.7 ppb), and Central Bay (12.9 ppb), and lower in San Pablo Bay (6.2 ppb) and Suisun Bay (4.5 ppb). Bay-wide average concentrations observed in 2007-2012 were lower than those in 2002-2003, particularly in Suisun, San Pablo, and Central bays - additional sampling will be needed to determine whether this is indicative of a long-term decline. Models suggest that sediment PCB concentrations must decline to about 1 ppb for concentrations in sport fish to fall below the threshold of concern. Suisun Bay has been closest to this level, with a minimum annual average of 2.0 ppb in 2011. Concentrations in South Bay and Lower South Bay do not appear to be declining.

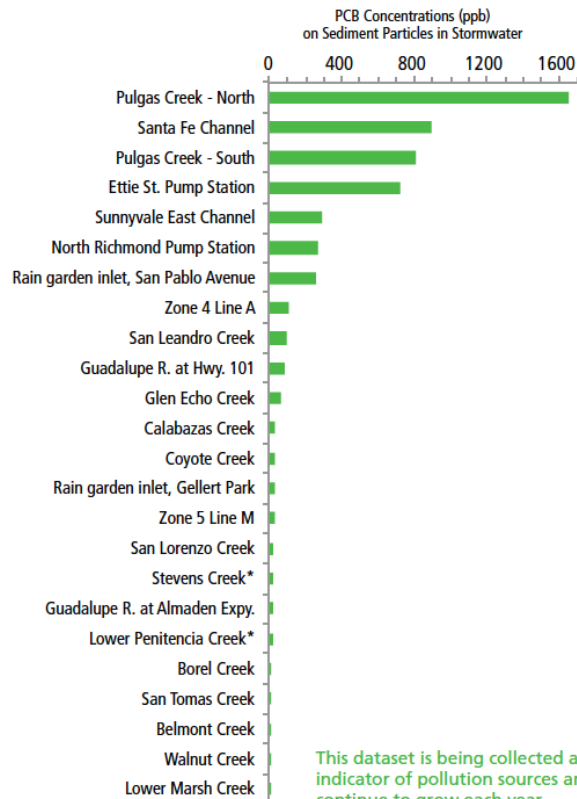


# Sources, Pathways, and Loadings

## Latest Loading Estimates

Although much has been learned about PCBs in stormwater monitoring over the past decade, a new estimate of total regional stormwater loads from Bay Area small tributaries has not yet been generated. However, stormwater likely remains the largest pathway. For loads to the Bay from the Delta, an updated estimate was developed that was slightly lower than the estimate included in the PCB TMDL. Recent estimates of total loads for POTWs and industrial facilities were well below the load allocations in the TMDL.

Pathway	TMDL Allocation	TMDL Load Estimate	Latest Load Estimate	Comments
POTWs	2	2.3	0.95	
Industry	0.035	0.035	0.007	
Stormwater	2	20	NA	New estimate not available
Central Valley	5	11	7.9	
Atmospheric Deposition	0	Net loss	Net loss	No new information



This dataset is being collected as a primary indicator of pollution sources and will continue to grow each year.

## Important Loading Information

Pulgas Creek Pump Station North and South, Santa Fe Channel, and Ettie Street Pump Station appear to have relatively polluted sediment particles and to represent high leverage watersheds where control actions will be a cost-effective way of reducing inputs to the Bay. Data on sediment particles from additional watersheds are being collected as a primary indicator of degree of contamination and potential for effective management action.

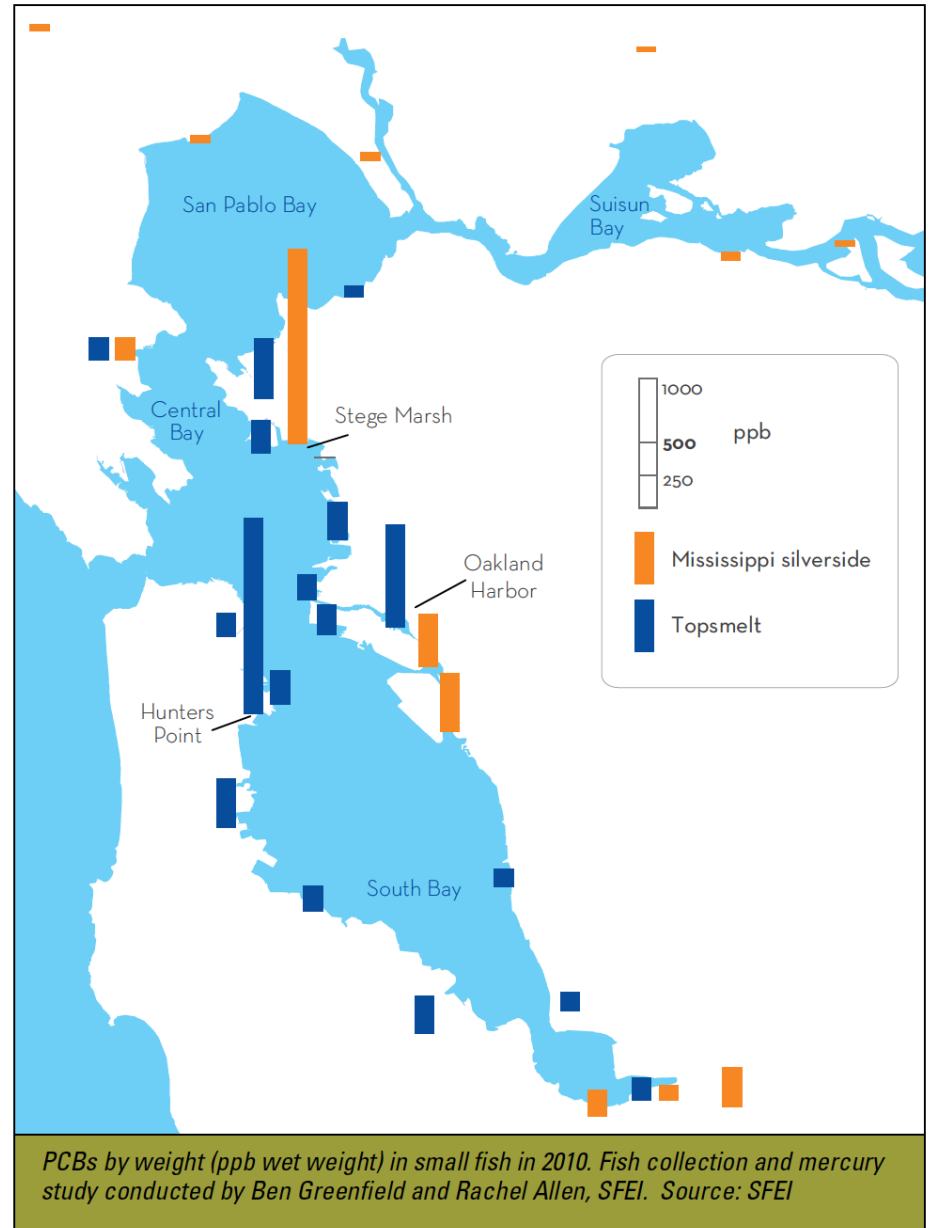
# Important New Findings

## PCBs in Small Fish

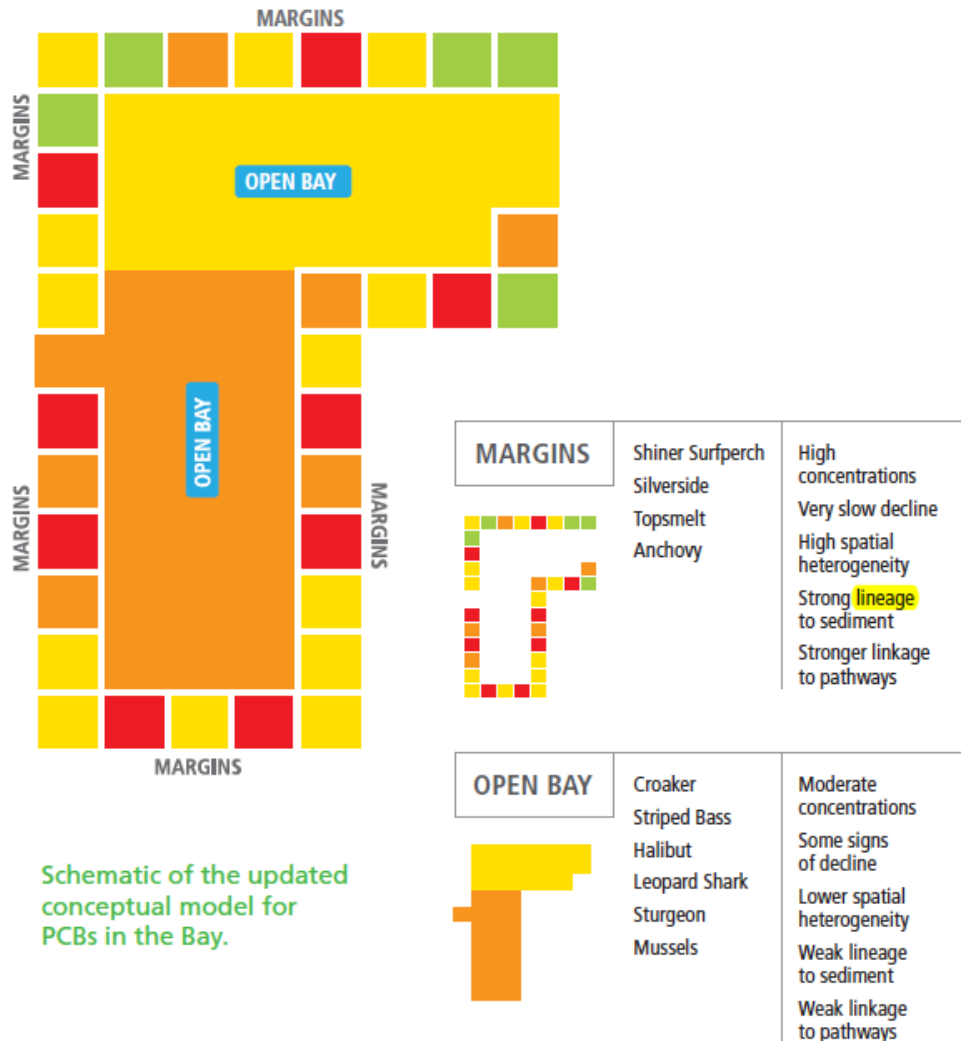
New information obtained from RMP monitoring of small fish collected along the margins of the Bay in 2010 fundamentally altered our understanding of PCB contamination of the Bay food web and potential pathways of exposure for sensitive wildlife species such as birds and seals. Small fish collected on the Bay margins accumulate high concentrations of PCBs that correlate with concentrations in sediment and represent a pathway for impact on fish-eating wildlife. These data, along with data for shiner surfperch, point to several contaminated margin sites that are high priorities for management, including: Hunters Point, Stege Marsh, Oakland Inner Harbor, Richmond Inner Harbor, San Leandro Harbor, San Leandro Bay, and Coyote Point.

## New PCBs? (PCB 11)

Recent studies have identified PCB 11, a PCB that had been previously overlooked, as a ubiquitous contaminant owing to its widespread use in pigments that are present in paint and in ink used in newspapers, magazines, and cardboard boxes. Based on the RMP data, PCB 11 that enters the Bay in wastewater and urban runoff is not persistent and is not accumulating in the food web. PCB 11 should be considered separately from the Aroclor-derived PCBs that are driving risks to humans and wildlife.



# Where We're Heading



Schematic of the updated conceptual model for PCBs in the Bay.

The PCB Synthesis was the foundation for a 2014 update of the PCB Strategy that calls for a multi-year effort to identify margin areas that are high priorities for management and monitoring, develop site-specific assessments and optimized monitoring plans for margin areas downstream of watersheds where management actions will occur, and perform monitoring in these areas as a performance measure.

The current plan is to develop and initiate monitoring for five priority margin areas over the next several years. Longer-term monitoring of these areas would then continue in order to detect PCB reductions in response to the actions taken.

A thorough and thoughtful effort is warranted given the large expenditures of resources that will be needed to implement management actions to reduce PCB loads from urban stormwater.