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TO: Bolinas Lagoon Advisory Council
FROM: Veronica Pearson, Open Space Planner
SUBJECT: 2016 Bathymetry Survey

Environmental Science Associates (ESA) completed a bathymetric analysis using data collected in 2012 from the U.S. Geologic Survey (USGS) and in 2016 from CLE engineering, and used the data to re-assess the current bathymetric conditions within Bolinas Lagoon and to revise projections for the geomorphic evolution of the lagoon. ESA (formerly Phil Williams and Associates (PWA)) prepared the report using a similar methodology that it developed for the *Bolinas Lagoon Ecosystem Restoration Feasibility Project: Projecting the Future of Bolinas Lagoon* (2006). The report combined projected sea-level rise (SLR) with the bathymetry data (1998), tidal datums, and estimates on historic tidal prism changes, sediment supply, and human activities to project the evolution of the lagoon by 2050.

The current analysis uses updated data on the bathymetry, re-surveyed benchmarks, vegetation, and tidal datums with the prior data to calculate change in bed elevations, tidal prism, and vegetation/mudflat boundary. Based on the latest projections (2012/2016) for SLR by 2050, SLR was assumed to be 1.5 feet, almost four times the SLR used by PWA in 2006. As with the 2006 report, this study does not consider earthquake induced subsidence in its 2050 projection.

In summary, the reassessment finds that the tidal prism has increased from approximately 3.7 million cubic yards (MCY)(1998) to 4.0 MCY (2012/2016). Projecting the future tidal prism in 2050 with the most current SLR estimates, ESA predicts the tidal prism to be 4.4 MCY, which is an increase from the present conditions, and almost double the projection of 2.5 MCY in the 2006 report.

The reassessment also found that there would be an increase in frequently submerged mudflats, subtidal shallows, and subtidal channels. Most of this change is due to the use of a higher rate of SLR of 1.5 feet as compared to that of 0.4 feet used in the 2006 report.

Using the revised tidal prism estimate, to calculate a 'stability index' using observations of near shore wave power, the projected 2050 stability index is 5.5. An index value greater than 12 is correlated with the potential of inlet closure based on studies of other sites. Therefore, it is not likely that the inlet would close by 2050.