Construction Aggregate Supply Limitations Fact Sheet
Some Estimates of Economic Impact
February 2018

- Aggregates are heavy-weight building materials used in construction, including sand, gravel, crushed stone, and recycled concrete. Aggregates are mined and either used as raw material (for example, as foundations) or serve as composite materials in the production of concrete and asphalt. The main end markets for aggregates, with approximate percentages, include private residential construction (34 percent), commercial construction (17 percent), and public infrastructure projects (43 percent, which includes 26 percent for public highways, streets and transit).

- Aggregates are usually shipped from quarries or production sites close to their end market because transportation is a major element in the cost of delivered aggregates and the cost depends on the distance of the delivery. According to the industry, shipping costs for aggregates can outweigh production costs if the material is trucked more than 20 miles.[1] Permitting new aggregate sites would lead to shorter haul distance to minimize transport and shipping cost.

- According to the California Geological Survey (CGS), California has an estimated 78 billion tons of aggregate resources underlying mineral lands studied by the State Geologist.[2] However, only approximately five to six percent have actually been permitted by local agencies for mining activities. Permitting of mining sites is difficult and time consuming due to environmental, land development, and zoning laws, and could take between five and ten years. At the current rate of production, available aggregate supply in some areas in the State could be depleted in a decade.

- According to the California Department of Finance, housing construction activity in California nearly tripled between 2009 and 2016 (from 36 to 101 thousand units), which has contributed to an increase in the demand for construction aggregate in recent years.

- According to the CGS, California produced 148.9 million tons (valued at $1.64 billion) of construction sand, gravel, and crushed stone in 2015, compared to 133.5 million tons (valued at $1.4 billion) in 2009, an increase of 11.5 percent. The transportation of 148.9 million tons of construction aggregates generates nearly 6.0 million truckloads (at 25 tons per truck), or a total of 11.9 million truck trips a year (including empty trucks returning to the aggregate sites) related to the transportation of construction aggregates in the State.[3]

- Truck transportation accounts for approximately 99 percent of shipping aggregates for 40 miles or less.[4] At an average 50-mile distance, the total aggregate-truck vehicle miles traveled (VMT) would be 595 million miles per year (11.9 million truck trips x 50 miles).[3]

- Assuming that permitting additional mining facilities would reduce the average hauling distance from 50 to 35 miles statewide, and using an average hauling distance of 35 miles, the total annual aggregate-truck miles of travel would be 417 million miles (11.9 million truck trips x 35 miles). The 15-mile shorter hauling distance would reduce aggregate-truck miles of travel by 178 million miles per year (595-417), and annual diesel fuel consumption by 23 million gallons [using California Air Resources Board (CARB) diesel fuel consumption rate of 0.13 gallons per vehicle-mile at 55-60 mph. A University of California, Berkeley, study[5] confirms that the most likely, and dominant, effect of the opening of new sites for the production of construction aggregates would be a reduction in truck miles of travel for

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1 Therese Dunphy, "Evening the Playing Field," *Aggregates Manager*, August 2006.

2 California Geological Survey, *Aggregate Sustainability in California, 2012* http://www.conservation.ca.gov/cgs/information/publications/ms/Documents/MS_52.pdf; http://www.conservation.ca.gov/cgs/information/publications/ms/Documents/MS_52_2012.pdf

3 California Geological Survey, http://www.conservation.ca.gov/cgs/minerals/min_prod/Documents/FINAL_NON-FUEL_2015_7-26-17.pdf

4 Tina Grady Barbaccia, "Off-highway Transportation," *Aggregates Manager*, July 2006.

5 Peter Berck, "A Note on the Environmental Costs of Aggregates," *Working Paper No. 994*, Dept. of Agricultural and Resource Economics and Policy, University of California, Berkeley, January 2005.

hauling aggregates (i.e., new quarries will be located closer to the users to minimize transportation costs), thus a reduction in emissions from trucks. Based on earlier CARB emission factors estimates, and assuming an average 55-60 miles per hour speed, a reduction of 178 million miles of truck travel (or 20 million gallons of diesel fuel consumption) would reduce carbon dioxide emissions by approximately 223,800 tons a year.[6]

- The total transportation cost of aggregates (at $0.10 per ton per mile) shipped 35-miles average distance throughout California would be slightly above $1.0 billion (11.9 million truck trips x 25 tons x 35 miles x $0.10), and nearly $1.5 billion if shipped an average distance of 50 miles. The statewide transportation cost savings due to reduced hauling distance would amount to $446 million a year, a 30 percent cost savings. More and closer quarries would save costs by the use of less fuel, decreased use of the trucks, and decreased wear on highways.

- The California Department of Transportation (Caltrans) estimates that on average, approximately $2.5 billion is spent on State and local capital outlay projects each year, and on average, aggregates account for 8-10 percent of total project costs, or approximately $250 million annually. A 30 percent increase/decrease in shipping cost of aggregates would increase/decrease the total annual project costs by $75 million.

- The reduction in aggregate-related truck miles of travel would also reduce traffic congestion and traffic accidents on roads, but these impacts would be difficult to estimate. An additional benefit from truck trip reduction would be reduced pavement deterioration. Caltrans expects to spend approximately $1.5 billion annually on pavement rehabilitation projects. Assuming trucks account for 60 percent of the pavement damage on the State highways, and aggregate-trucks on average account for 5 percent of all heavy truck travel on the State highways, the trucks shipping aggregates would account for approximately $45 million of cost savings in the pavement rehabilitation each year.

- Project delays due to lack of aggregate supply in the area would also result in project cost escalation and reduced user benefits (reduced travel time and accidents) that would have otherwise been generated.

- Generalizing, and pro rating, the user benefits estimated for the Interregional Transportation Improvement Program projects, a delay of ten percent of the capital outlay program for one year could also pose significant costs for California in increased roadway congestion and traffic accidents.

In conclusion, with a limited supply of construction aggregates, increased homebuilding, and more long-term funding provided through Senate Bill 1, there is concern that there will be a severe shortage of construction materials.

***Data based on the most recent information of the California Department of Conservation (2012), which is to be updated in 2018**.

[6] U.S. Energy Information Administration, https://nnsa.energy.gov/sites/default/files/nnsa/08-14-multiplefiles/DOE%202012.pdf