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UPDATE OF NEA POPULATION AND CURRENT SURVEY STATUS

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ABSTRACT

This presentation updates past presentations of the estimated size-frequency distribution of Near-Earth Asteroids, and the progress toward completion of surveys. The current update using discoveries through July 2018 results in almost no change in population estimate from the previous 2016 and 2017 estimates. Our latest estimate of the number of NEAs of H < 17.75 (D > 1 km) is 942, based on discoveries of 890 as of end of July 2018, or a completion of 94%. We estimate a total population of H < 22.0 (D > 140 m) of 21,500, of which about 8,170 have been discovered, for an integral completion to this size of 38%. In spite of the high level of completion to 1 km diameter (only about 50 remaining undiscovered, and we expect the largest single undiscovered NEA to be no larger than 2-3 km diameter), the residual risk from these few large bodies is comparable to the risk from more frequent events of smaller size, thus a closer look at the undiscovered population of large NEAs is warranted. In examining the discovery rates of very large NEAs over the past 18 years and normalizing by the annual survey discovery rate of smaller NEAs where completion is modest even currently, we find that discovery rate of the largest bodies is more or less proportional to the estimated number remaining undiscovered, thus the number remaining undiscovered is close to exponential with a characteristic time scale of ~7 years. That is, present surveys reduce the number of undiscovered large NEAs by a factor of ~*e* every 7 years. One can infer from this that present groundbased surveys will require about 30 years to discover the very

last D > 1 km NEA. However, the good news is that most of the remaining undiscovered objects are in near-resonant orbits, so they are unlikely to arrive “out of the blue” on impacting paths, but rather will make repeated ever closer passes as their resonant trajectories approach the Earth and thus are likely to be discovered multiple orbits before an ultimate impact.