

Harris Chain of Lakes TP loading estimates

Comparison of TMDL Baseline (1991-2000),
with 2009 land uses and baseline period
hydrology

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2007 BMAP TP loading projections

- Compared TP loading for TMDL baseline period (1991-2000) with expected loadings under future (2010) land use conditions
- For many basin areas, that future land use map appeared to overestimate development in the basin
- Now have 2009 land use maps and loading estimates, but recent years have had lower rainfall and tributary flows than during the baseline period



Improved estimates of effects of basin development on TP loading

- Compare TP loading during TMDL baseline period (1991-2000) with expected loading under 2009 land use conditions and baseline period hydrology – rainfall and tributary flows



Baseline period (1991-2000) TP loading estimates

- Major tributaries (Palatlakaha River and tributaries connecting lakes)
 - Daily discharge volumes measured at dams
 - TP concentrations measured generally monthly
- Atmospheric deposition
 - TP in rainfall and in dry deposition measured from wet/dry deposition collector located near Lake Apopka
 - Network of rain gauges in or near basin



Baseline period (1991-2000) TP loading estimates

- Stormwater runoff
 - No direct measurements in basin; estimated by modeling approach, based on studies conducted elsewhere that determined runoff from different types of land use
 - Data needed for estimates – maps of drainage basins, land use, soil type, distance of drainage subbasins from lake, and rainfall
 - Runoff estimates based on 1987 and 1995 land use maps
 - Stormwater treatment assumed for land developed after 1987; treatment efficiency based on studies in Florida – 63% removal of TP



Baseline period (1991-2000) TP loading estimates

- **Septic tanks**
 - No direct measurements in basin; estimated by modeling approach, based on studies conducted elsewhere
 - Assumed no loading from houses within service areas of municipal wastewater treatment plants (WWTP), or from areas served by package treatment plants located > 200 m from lakes
 - All houses outside of WWTP service areas and package plants within 200 m of lakes assumed to contribute septic tank loading
 - Number of contributing houses estimated from 1995 aerial photos



Septic tank loading estimates

- For contributing septic systems:
 - 6.7 pounds TP/year discharged to drainfield
 - 90% of TP discharged is retained within drainfield
 - Assumed no septic tank failures



Baseline period (1991-2000) TP loading estimates

- Muck farms – permit records of discharges when available, otherwise estimated by relating available discharge data to rainfall
- SJRWMD restoration areas – TP measurements, combined with pump records or stormwater runoff methods
- Point sources – FDEP permit files
- Springs – periodic measurements of TP and discharge volumes



2009 land uses with baseline period hydrology

- Estimate stormwater TP loading using 2009 land use map, but same rainfall as used for baseline period (1991-2000)
- Subtract stormwater load reductions from BMAP projects
- Incorporated 30% TP load reduction for agricultural lands enrolled in agricultural BMP programs



2009 land uses with baseline period hydrology

- Remaining muck farms – after further discussion we decided to continue to use same load estimates as during the baseline period
- Septic tanks – New count of contributing houses from 2009 aerial photos
- SJRWMD restoration areas – assume 1 lb TP/acre/year

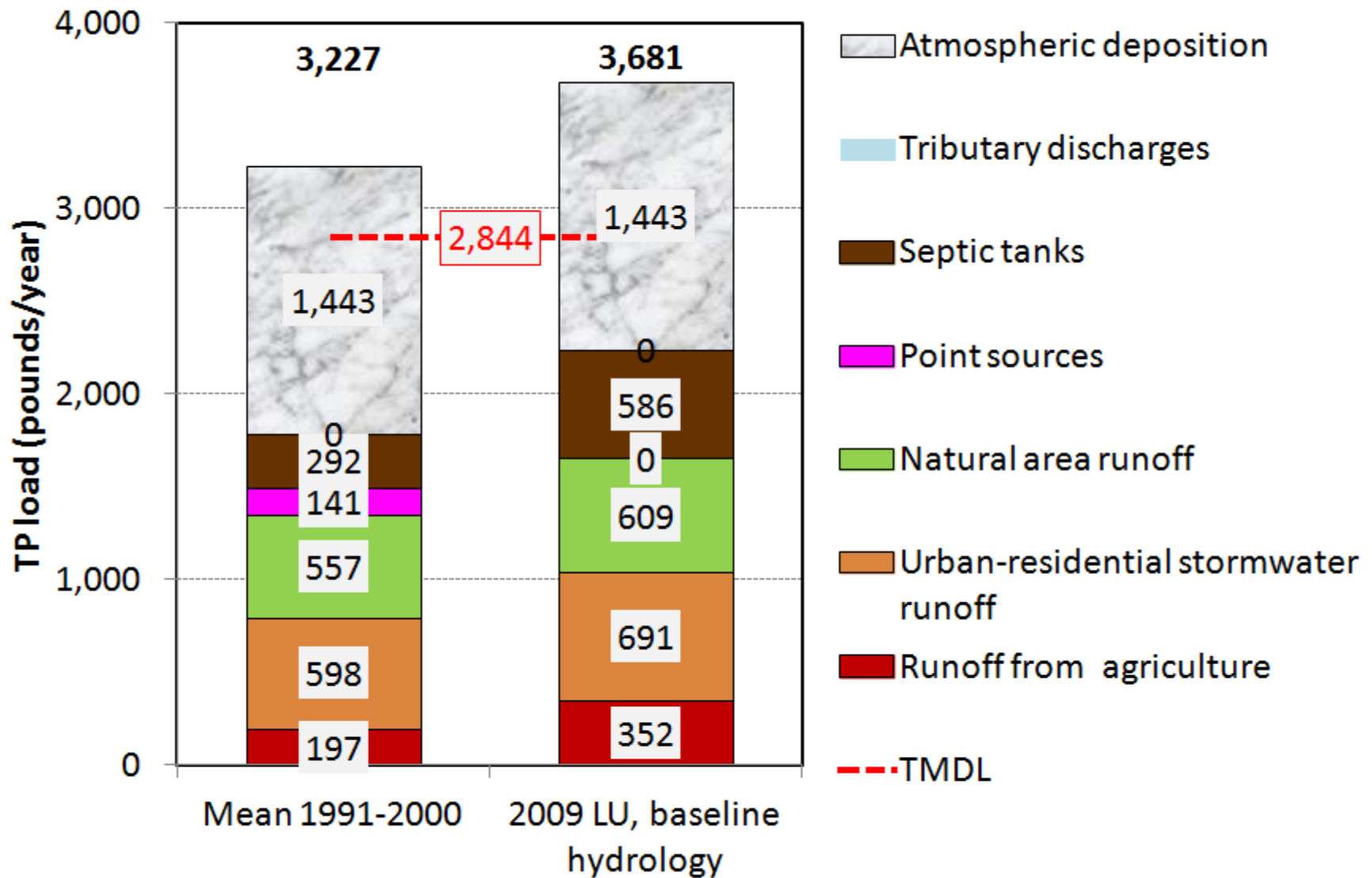


2009 land uses with baseline period hydrology

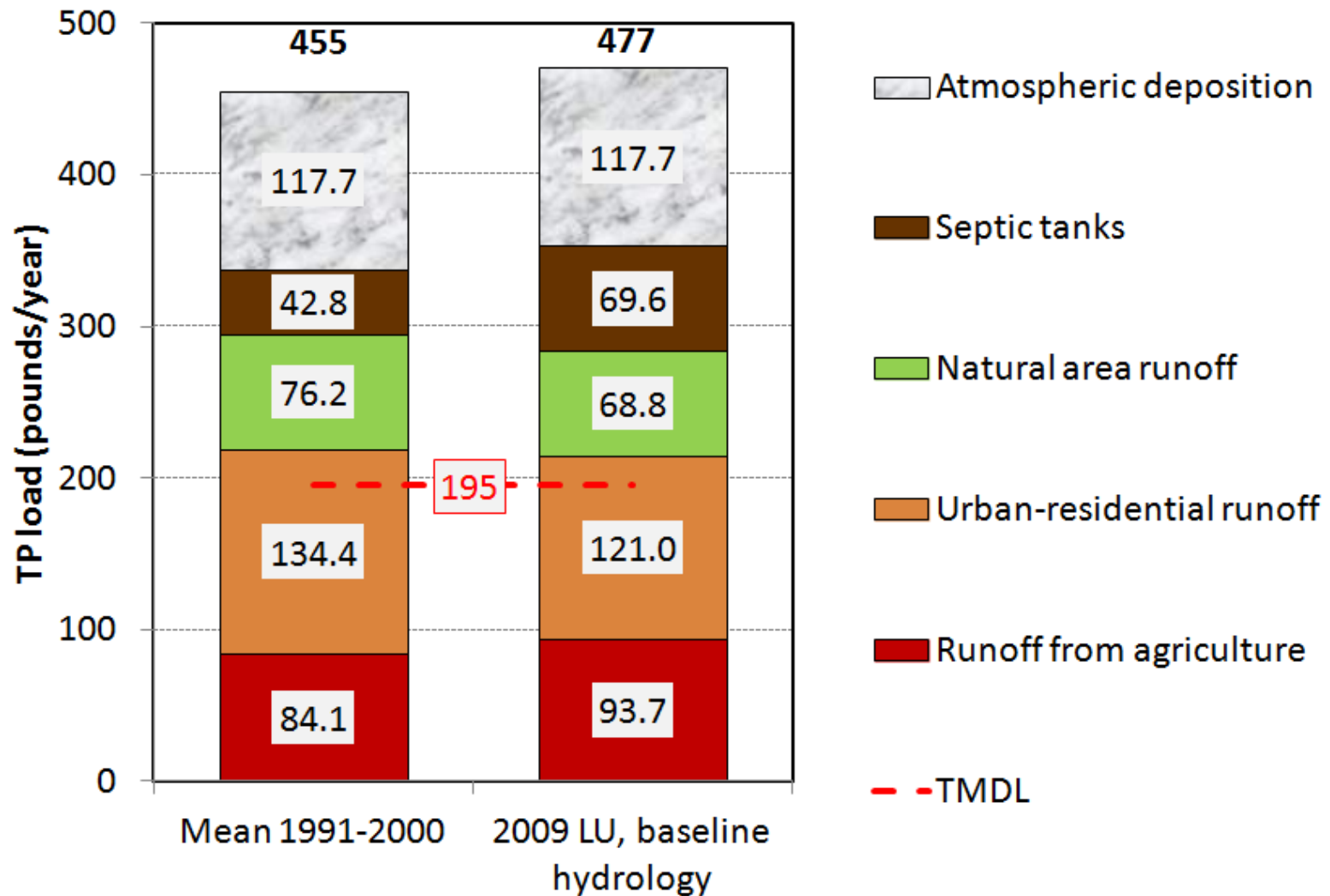
- Tributary loads from Palatlakaha River or from upstream lakes – assume to change proportionately to the loads to those upstream basins
- Point sources – use average for last 5 years (~0 other than for Apopka)
- Other sources assumed no change in loading from baseline (atmospheric, springs)



Lake Yale estimated total phosphorus loads



Lake Carlton estimated total phosphorus loads



Lake Harris estimated total phosphorus loads

