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|  |  | Equation 1 |
| where *Sw(t)* is total sediment loading from Faga'alu Stream in month *t*, *Ri(t)* is mean water residence time over the reef flat at location *i* (either the mean of the month or mean during storm events), and *SBi*is substrate type (live coral, dead coral, coralline sand, mud) at location *i*, which is a proxy for sediment availability in the microenvironment around the sampling location. | | |

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|  |  | Equation 2 |
| where SW is the sum of *SSYi* for n events in the month, calculated from Equation 4. | | |

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|  |  | Equation 3 |
| where *Ri(t)* is the water residence time for month *t*, is mean monthly swell height, and *a* and *b* are calibration coefficients that differ for each grid cell. Depending on the modeling results from Paper Two, it may be necessary to calculate and average water residence time daily to determine mean monthly residence time, or include a term for wind-driven flow. | | |

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|  |  | Equation 9 |
| where is the monthly sediment accumulation measured at trap *i in month t* SedAccMax is the highest observed sediment accumulation of all sediment traps in month t, *Vϴi* is mean flow velocity in the direction away from the stream mouth at location *i* in month *t,* and *di* is distance from the stream mouth at location *i.* | | |