The Skagit River originates in the Cascade Mountains and flows 180 km to the Willapa Bay in Puget Sound. It delivers about 35-55% of the freshwater discharge to its estuary with peak discharge during the spring freshet and winter storms.

Mean current magnitude and suspended-sediment concentration (as indicated by AVI backscatter) are highest just prior to peak freshet discharge during the spring freshet and winter storms.

Suspended-sediment concentration is significantly higher on the inner flat than the outer flat during high-discharge periods.

Suspended-sediment concentration rapidly decreases to less than 1 mg/L within subtidal regions.

Physical processes move fine-grained sediment to the flat edge.

Sediment discharged to the flat from the Skagit River is trapped on flood tide and released on ebb tide of Spring tides.

As it passes over the flat, highest velocities are on ebb tide in channels, and in the southern channelized region, one directed net seaward.

Sediment interacts with dynamic channels as indicated by channel morphology and temporary deposits of fine-grained sediment.

Once sediment reaches the flat edge in the latter stages of ebb tide, currents in the gutter tend to carry it southward.

Therefore, constrained tidal currents paired with timing of fine-grained sediment export determine fate of fine-grained sediment.

Sedimentary structures are preserved within the seabed.

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Fine-grained sediment is delivered to subtidal regions rapidly and seasonally.

Examination of sediment trapping and release: Spring Freshet

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Sedimentary structures are preserved within the seabed.

Kasten core (F16KC) from northern Saratoga Passage. Total 210Pb activity decreases to supported levels at ~100 cm depth in core. Excess activity indicates an accumulation rate of ~1 cm/y. The seabed is ~60% clay and 40% silt, and benthos are able to bioturbate intensely and destroy physical sedimentary structure (as seen in X-radiograph negative).