

Technical Memo

Indian River Working Group

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Recent Streambank Erosion Observations

Channel erosion concerns along the Sitka National Historical Park Reach (1) of Indian River was identified as a key issue in the Indian River Collaborative Management Strategy (2018). Six stream cross-section erosion transects were established in 1995 to assess channel stability in the vicinity of the Pedestrian Bridge and rip-rap structures along the river estuary. Three additional transects were located between the Pedestrian Bridge and the Sawmill Creek Bridge in 2017. These new sites were never surveyed because grant funding expired before the work could be completed. The National Park Service has proposed using a series of lidar surveys collected over the past 5 years to estimate rates of stream channel entrenchment and widening, however, the lidar data has not yet been analyzed to establish the efficacy of this approach. The Interfluvial Geomorphic Assessment and Concept Design Report (March 2020), recommended using photo points for monitoring channel condition along this segment of the "Park Reach". This memo represents a preliminary effort to qualitatively assess recent channel erosion in the National Historical Park Reach of Indian River.

Accelerated channel erosion within the last few years has been noted along the east side or left bank in the Park Reach of Indian River above the Pedestrian Bridge, upstream to the Sawmill Creek road bridge. Various investigations have attributed this apparent change in erosion processes to a combination of sediment capture above the hatchery diversion dam and a high frequency of high flow events in recent years. Implementation of Alternative 1 of the Interfluvial Concept Design Report will augment sediment supply to lower Indian River with the objective of improving sediment transport dynamics in the Park Reach. Ongoing monitoring of photo points, lidar and/or ground based geomorphic surveys will be needed to assess the effectiveness of proposed sediment augmentation techniques.

A major flood peak of 3,800 cfs (fig. 1) was recorded at the Indian River stream gage on September 20, 2019. An additional 6 channel forming high flow events (1,000 to 1,500 cfs) were observed between October 2019 and April 2020 in Indian River. The magnitude and

frequency of these events need to be considered in evaluating changes in channel conditions and sediment transport dynamics within the Indian River Watershed.

Figure 1 Indian River NP Reach flood stage September 2019,(3,800 cfs).



The following series of photos taken in April of 2020 illustrate current stream bank condition associated with monumented stream bank cross-section transects within the National Historical Park reach beginning at Transect 4 near the estuary, and extending to Transect 9 located about 75m downstream of the Sawmill Creek bridge. These photos focus exclusively on the river left bank where the most significant channel erosion and bank retreat have been observed. Photo documentation of right bank conditions was made at the same time but these photos are not included in this memo because minimal disturbance has been observed along the right channel bank.

Significant bank slumping occurred at Transect 4 (left bank) in 2019-2020 (fig 2). This site is 130 m downstream of the new Pedestrian Bridge. It was the location of an early bridge crossing (note concrete bridge abutment in the middle right of the photo). Three large alder that were on top of the old bridge abutment have tipped into the channel.

Some channel widening was also observed at Transect 5 (fig 3). This site is located 20 m below the new Pedestrian Bridge. A small conifer has been undermined by recent erosion along the left bank at this site.



Figure 2. Transect 4, Left Bank



Figure 3. Transect 5, Left Bank



Figure 4. Left Bank between Transects 7-8

Extensive streambank sluffing is evident along the river left bank between Transects 7 and 8 (fig 4). This channel segment is 60 to 90 m upstream of the Pedestrian Bridge. A large conifer stem with root wad entered the active channel this winter. This woody debris structure should afford some protection to the adjacent stream bank. This structure will also provide beneficial aquatic habitat complexing. It is well anchored in the stream bed and should not be an imminent risk to the downstream bridge structure.

Another large conifer and vegetation root mat at Transect 8 is being undermined (fig 5). This section of streambank will likely slump into the river during one of the next flood / wind storm events.

Streambank conditions are similar at Transect 9 close to the Sawmill Creek Road bridge crossing (fig 6). However no large trees are likely to enter channel at this location in the near term.

In summary, significant streambank erosion processes are active in the National Historical Park Reach of Indian River. Channel condition in this reach is closely linked to sediment transport and flow dynamics within the watershed. Continued monitoring of river geomorphology is recommended to assess aquatic ecosystem health and effectiveness of management and mitigation actions in the Indian River Watershed.



Figure 5. Left Bank erosion near Transect 8.



Figure 6. Transect 9, Left Bank