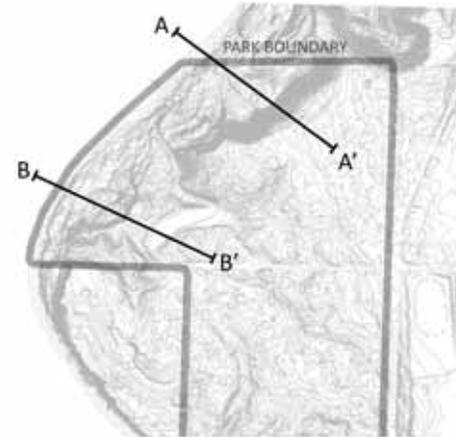


deposited on the beach from above, and in turn indicated that the beach is accreting. The AES study's findings indicate that the site is undergoing a steady, incremental retreat caused by beach erosion and toe cutting. Furthermore, removal of material from the toe of the site with consequent reduction in lateral soil resistance is resulting in down-slope soil creep moving upward through the landslide mass to the head scarp. However, the landslide complex appears to have maintained its near current configuration for some time.

The natural wave erosion of the bank along the beach appears to be the primary factor behind the soil creep and small scale sloughing and land sliding which then move upslope from the beach. The beach erosion appears to occur predominantly as a result of extreme tide and storm events. The AES study indicates that soil creep from the bank upward to the main head scarp may take a period of decades followed by long periods of relative inactivity as vegetation reestablishes. This study states that there is a moderate likelihood of localized small to moderate-scale landslide activity. Annual erosion and sloughing is also likely along steep slope areas, primarily resulting from freeze-thaw action, direct runoff erosion, and natural weathering processes.

A minimum of a 40' building setback from the top of the head scarp is recommended by AES in order to provide a suitable buffer to protect future structures and associated improvements. AES recommended that mitigation for soil creep around any structures near the beach should include structurally rigid mat foundation to reduce soil creep and differential sediment within the structures. All utility connections should be flexible in order to allow a measure of play within the lines. Cuts and fills no greater than 1' should occur within 15' of the top of the head scarp or shoreline bank. All storm water from impervious services should not discharge directly onto the steep slopes. Surface water drainage should be directed away from the slopes or tightlined to the bottom of the slope. All vegetation should remain in place to provide root support for the soil.

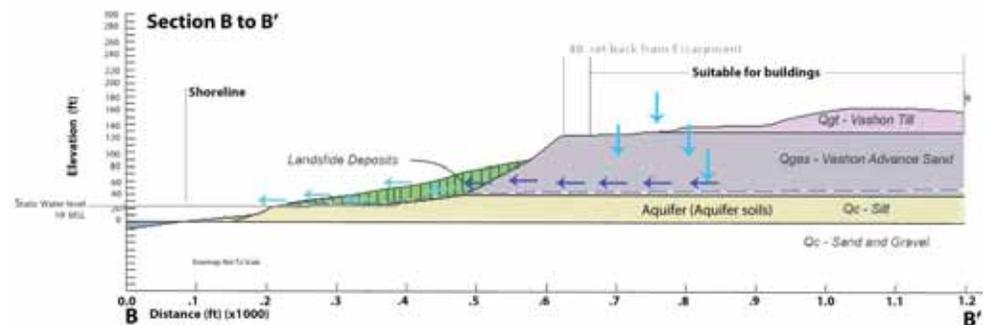
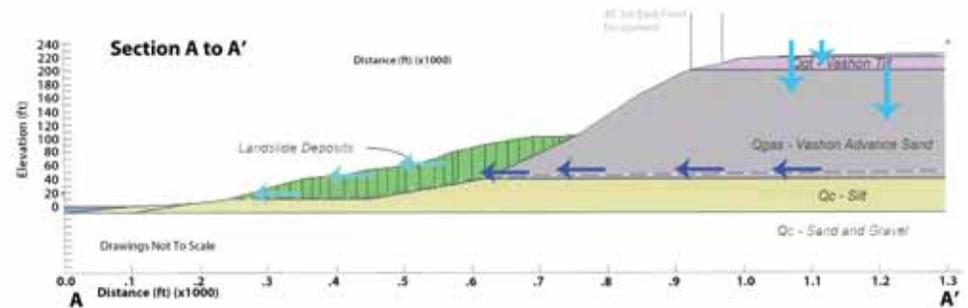
Predicted sea level rise should be considered in the location and design of major structures and facilities.



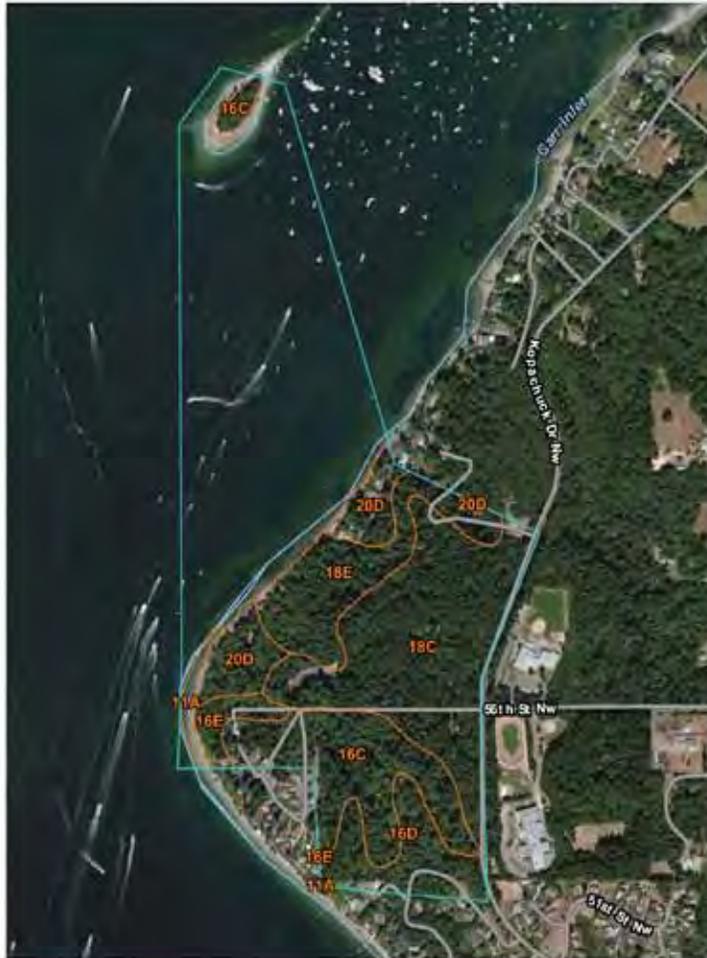
Legend: Geologic Soils Section Cut

- ↓ Rain Water Infiltration
- ← Interflow (infiltration that does not seep into Aquifer soils)
- ← Interflow Seeps (areas where ground water reaches the surfaces and actively contributes to erosion and wetlands)

- Qls** LANDSLIDE DEPOSITS - Unstable Glacial Sediments
- Qgt** VASHION TILL SOILS - Mixed/Unsorted Boulders, Rocks, Sand, Silt, and Clay
- Qgas** VASHION ADVANCE SAND - Unstable Sand and Gravels Deposited by Glacial Melt Water
- Qc** VASHION SILT, SAND, OR GRAVEL - Aquifer Soils



ORIGINAL GRAPHIC BY ASSOCIATED EARTH SCIENCES



Map Unit Legend

Pierce County Area, Washington (WA653)			
Map Unit Symbol	Map Unit Name	Acres in ADI	Percent of ADI
11A	Coastal beaches	2.4	0.9%
18C	Harstine gravelly ashly sandy loam, 6 to 15 percent slopes	29.5	11.7%
18D	Harstine gravelly ashly sandy loam, 15 to 30 percent slopes	14.7	5.8%
18E	Harstine gravelly ashly sandy loam, 30 to 45 percent slopes	4.5	1.8%
18C	Indianola loamy sand, 6 to 15 percent slopes	51.3	20.3%
18E	Indianola loamy sand, 15 to 45 percent slopes	21.0	8.3%
20D	Kitsap silt loam, 15 to 30 percent slopes	13.4	5.3%
Subtotals for Soil Survey Area		136.9	54.1%
Totals for Area of Interest		253.1	100.0%

Soils

The USDA Natural Resources Conservation Services has mapped the park's soils as follows:

The northern portion of the park (including the parking lot, campground, and lower beach area) is mapped as Indianola Loamy Sand. A typical section of Indianola Series can be described as: "The surface layer, 7" thick, is a dark brown loamy sand. The underlying material, to a depth of more than 60", is dark yellowish-brown, brown, or olive-brown sand..., permeability is rapid..., and the erosion hazard is moderate."

The southern portion of the park (south of 56th St NW) is mapped as Harstine Gravelly Ashly Sandy Loam. This series can be described as: "A thin mat of undecomposed very strongly acid needles and wood overlies a surface layer of dark yellowish-brown gravelly sandy loam 5" thick. The subsoil to a depth of 31", is dark yellowish-brown, brown, and dark brown gravelly sandy loam. The substratum to a depth of more than 60" is compact glacial till that is cemented in places.... A water table is perched above the very slowly permeable, weakly cemented, and compact substratum during periods of heavy rainfall.... Ponding is of short duration because water flows laterally above the substratum and seeps at the bottom of slopes.... Surface runoff is medium and erosion hazard is moderate."

There are smaller areas (primarily in the far southwest corner of the park) mapped as Kitsap Silt Loam.

The Harstine Series can be efficiently used for siting of stormwater infiltration facilities. However, the Indianola Series generally tends to eliminate stormwater infiltration as a flow control methodology; instead, detention and release systems are more common.

Land Use Regulations

Any improvements (building, site development, grading, etc.) will be subject to Pierce County land use, environmental (SEPA and critical areas), and building permitting requirements. This would include compliance with the "Gig Harbor Community Plan" design standards and Pierce County Fire Prevention and Emergency Vehicle Access regulations.

Vegetation

A 2009 vegetation survey of Kopachuck and Cutts Island identified five different plant associations or vegetation communities within the park. While there were no rare plants recorded in the park, there was an unusually high occurrence of California wax myrtle on Cutts Island. There are no other records of this plant occurring naturally in the southern Puget Sound region. There are problems with invasive plant species within the park, particularly near trails and roads. English ivy poses the most serious problem, both at Kopachuck and even more severely on Cutts Island.

Wildlife

Although the master plan focuses on facility recommendations and does not address habitat management, care was taken to limit disruptions to the natural environment. Most recommendations are for replacements within existing footprints and disturbed sites. The new interpretive trail will be laid out with input from park stewardship staff to avoid negative impacts to important habitat trees or other resources.

Wildlife frequently seen in the park include deer, fox, raccoons, and a plethora of bird species. Bald eagle nests and a great blue heron colony have also been documented in the vicinity of the park. There is also a seal and sea lion haul out in the area. No threatened, endangered, or sensitive species have been identified within the park.

Regulatory Requirements

Shoreline Master Program Designation

Currently, the shoreline designation is “conservancy.” The county is updating its shoreline master program and the proposed designation for the park is “natural.”

Historical and Cultural Preservation

There is one recorded cultural resource site within Kopachuck State Park but it will not be disturbed by proposed facilities. There are no historic sites or structures listed on either the national or state historic registers.





Vehicle Access

Vehicular access is of the west of Kopachuck Drive NW / 106th Ave NW. Both are Pierce County roads. The current entrance is on the north side of 56th Street NW, about halfway down the road. There is a one-way entrance and access into the existing parking lot and a one-way exit back onto 56th Street NW. There is a sign on southbound Kopachuck Drive NW indicating entrance to the park, but there is no sign on the northbound side.



Beach Road

Vehicle and pedestrian access from the parking lot to the beach is via a gravel road. Access is controlled by the ranger through a manually operated and lockable gate at the north end of the main parking lot. The gravel surfacing is in relatively good condition and does not exhibit any significant erosion of the travelled surface itself. This road is used by service trucks (for beach area restroom and maintenance), park visitors (limited mostly to interpretive class leaders and car-top boat launching), and fire/sheriff vehicles. The fire department has expressed concern over the lack of a proper turnaround at the bottom of the access road.



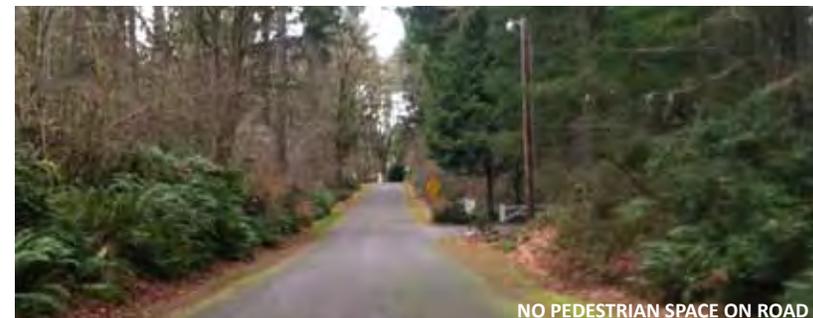


Parking

Because of the risk of falling trees, the existing main parking lot has been reduced in size to a total of 150 stalls. The current parking lot, while set up for 90° parking, is less than the current standards for width. The current configuration is 116' for two double-loaded 90° bays; however, the standard for the same configuration is 130' with a 2' separation between bays. The parking lot is paved with asphalt and is in relatively poor condition. There are obvious signs of significant pavement and asphalt curb failure, erosion problems at the perimeter, and moss growth.

Pedestrian & Bicycle Access

There is no bike lane currently nor has Pierce County proposed one on roads adjacent to the park. There are no crosswalks between the schools and park entrance; moreover, the lack of sidewalks on 56th Street NW means that students visiting the park from the elementary and middle schools must walk on the side of the road.



Water System

The park receives domestic water supply from a single water well (constructed in 1980) located on state park property near the southwest corner of 56th Street NW and Kopachuck Drive NW. This system is a shared source facility that serves the park as well as Kopachuck Middle School and Voyager Elementary School (Peninsula School District). This system includes the well, a treatment facility, a distribution system, and a 40,000 gallon storage facility. There is an additional 70,000 gallon offsite fire flow storage and booster pump facility on school district property but this is for school protection only. The shared water system is managed by Peninsula Light Company which operates other small systems as well. The park is served by a 6" line from the storage tank which splits to serve the schools.

There is one fire hydrant located at the northwest corner of 56th Street NW and Kopachuck Drive NW. No hydrants exist within the park property.



EXISTING PUMP HOUSE

WATER CONNECTIONS IN KOPACHUCK STATE PARK:

- Staff Residence
- Park Shop
- Day Use Area (2 spigots)
- Closed Trailer Dump (1 spigot)
- Closed Campground (6 spigots)
- Closed Campground Restroom
- Day Use Area/Restrooms
- Beach Restroom

On-Site Sewage Disposal (Septic Systems)

DAY USE & BEACH RESTROOMS

The day use lot restroom effluent is drained via a gravity line to a septic tank and lift station at the beach area restroom. From there, the effluent is pumped via a 2" PVC force main (in the same trench as the gravity line) to a distribution box and Type-A drain field located on the south side of 56th Street NW on State Parks property. This drain field, constructed in 1972, has never experienced failure or problems, even during periods of heavy use or extended rainfall.

CLOSED CAMPGROUND RESTROOM

This restroom, constructed in 1967, is served by a septic tank and gravity drain field within the open lawn area adjacent to the building. It is completely separate from the day use and beach restroom facilities.

RANGER HOUSE & SHOP

These two facilities have their own septic systems separate from the other two systems.



Storm Drainage

The park does not have a modern storm water collection conveyance or treatment system. The roadways and parking lot drain untreated to the northwest with eventual surface discharge to the beach. There is some infiltration as well as transpiration and evaporation along water courses leading to the beach. The main parking lot is paved with asphalt and is in relatively poor condition. There are obvious signs of significant pavement and asphalt curb failure and erosion problems along the west edge. The parking lot sheet flows to the northwest and drains into openings along the perimeter, channeling runoff down the receiving courses. There are two main natural receiving courses draining the parking lot, both of which eventually convert to small streams or water courses with discharge to the beach.

The former campground roadway and paved campsite areas generally sheet flow to the adjacent vegetated areas.

The existing gravel access road from the parking lot down to the beach area does not have a formal collection/conveyance system. However, the gravel surfacing is in relatively good condition and does not exhibit any significant erosion on the travelled surface itself. There is a shallow ditch on the north side of the road which collects and conveys groundwater to the base of the slope where it is released in an open stream and eventually leads down to the beach.

Power

Electrical service to the site is provided by Peninsula Light Company. Single phase power is fed underground from 56th Street NW to above-grade transformers at a number of locations throughout the site. Underground power service to the beach area is down the beach road.



WATER COURSE WITH DISCHARGE TO THE BEACH

Public Transportation

Pierce Transit has no service to the area and no plans for such in the immediate future.

Fire Service

The site is served by Gig Harbor Fire and Medic 1. In the past, most emergency responses to the site were water-related, requiring emergency response teams to have access to the water. Accordingly, response teams often used personal water craft for rescues. For easy access, road widths need to be at least 12' wide with 14' height clearance. Parking areas should avoid choke points and emergency services must have either keys in knox boxes or codes to lock/unlock the gates and bollards. The existing access road has proved suitable but a standard hammerhead turnaround is required. Designated emergency vehicle parking is also needed.

Law Enforcement

Law enforcement is provided by State Park Ranger staff. No serious crimes have been reported at the park. Most law enforcement issues have dealt with car prowls.

Schools

There are two schools across the street from the park: Voyager Elementary School and Kopachuck Middle School. The middle school includes field trips to the site as part of its science curriculum; however, due to safety concerns resulting from the lack of crosswalks and sidewalks/trails, the schools have had to limit their park use. In addition to safety concerns, the time required to walk from the school to the beach has also been an issue due to the short class periods.

Introduction

The park includes forty-one standard campsites and a group camp area (both now closed), one marine trail campsite, fifty-five picnic tables, four shelters, a facility shop/office building, a staff residence, three restrooms, and one CXT vault toilet. The shop/office and ranger residence were not addressed within the scope of this master plan and there are no proposed changes to these. The park also includes an underwater marine park, two mooring buoys, and approximately three miles of hiking trails.

Restroom Facilities

There are four restroom facilities on the site: one in the day use area adjacent to the parking lot, one at the beach area, one at the abandoned campground, and one vault toilet restroom at the former group camp.



DAY USE AREA

This building, constructed in 1959, does not meet current ADA requirements. In particular, deficiencies include:

- no accessible route to the building
- significant grade differences between the restroom and parking area
- clearance around the toilet does not meet the 60" x 56" minimum
- grab bars are not properly located
- toilet centerline is too close to the side wall
- the exterior approach to the restroom door is too narrow
- toilet accessories – mirrors and soap/paper towel dispensers – do not meet ADA mounting heights

The building and fixtures do not comply with current energy standards. To remedy these deficiencies, the building would need to be enlarged. Modifying the existing structure and access routes to comply with current codes would be more expensive than demolition and replacement. That fact, coupled with the age of the restroom itself, makes remodeling the restroom untenable.