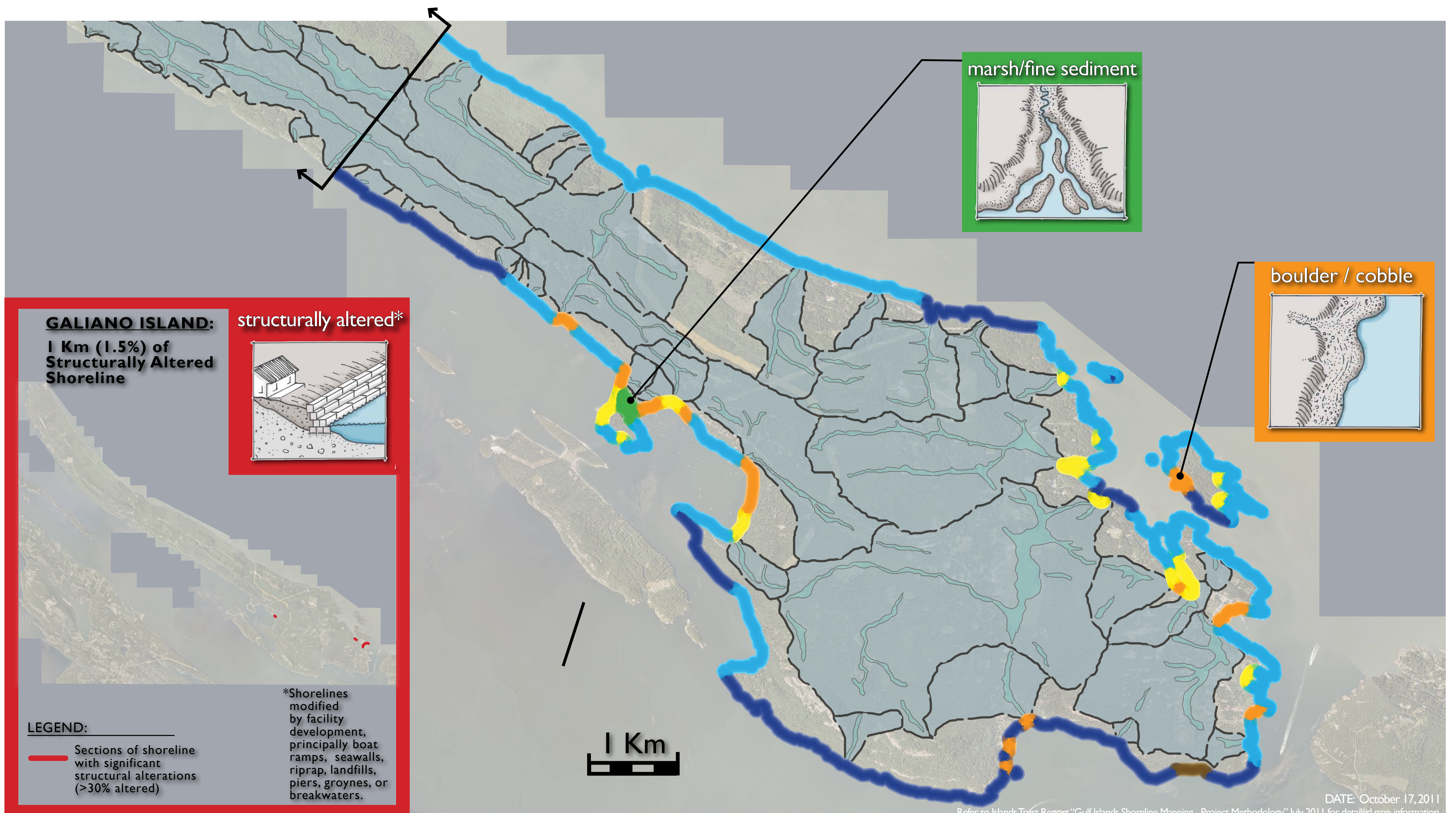
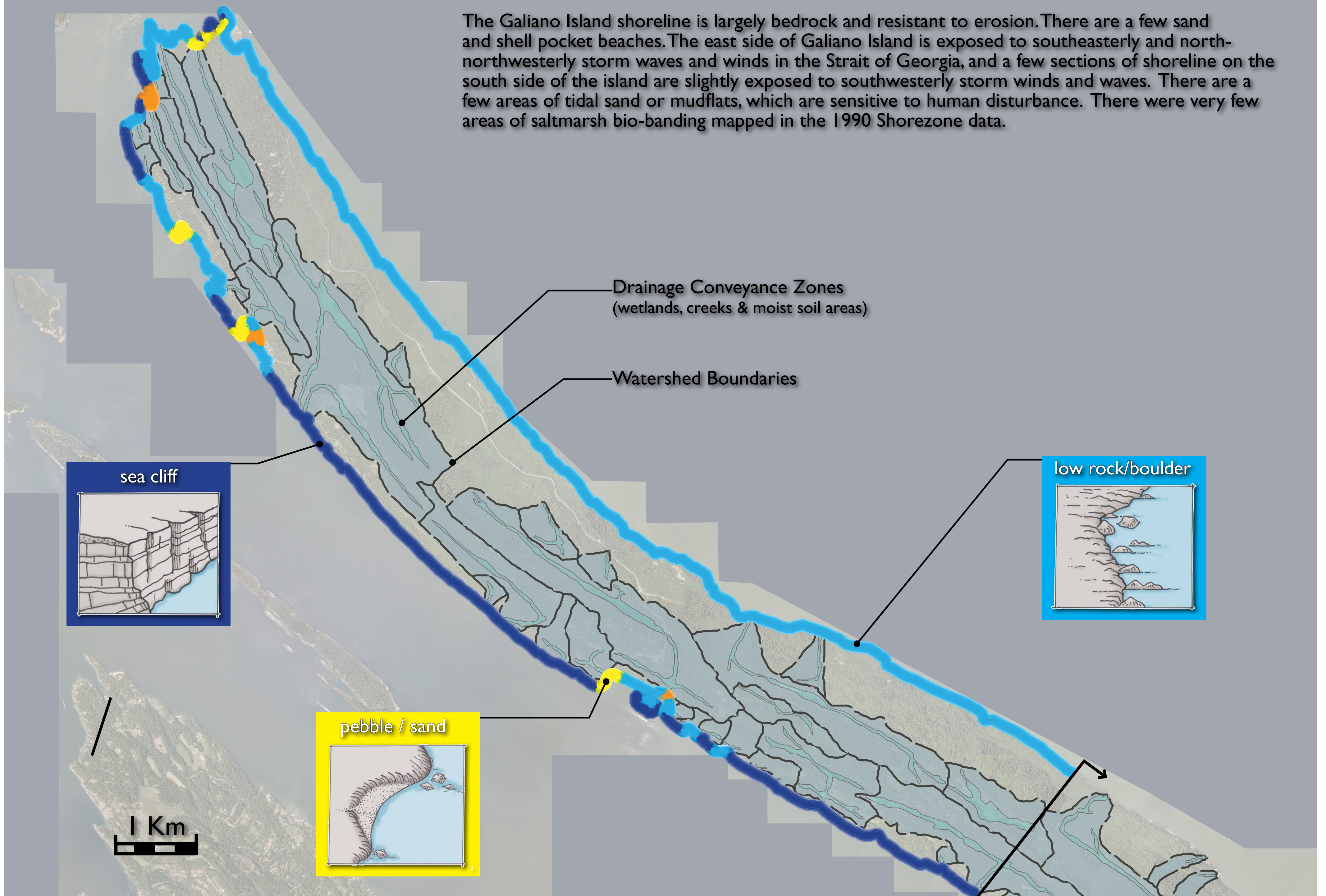


# GALIANO Is.

## MAP 1 of 3: Distribution of Shoreline Types

The Galiano Island shoreline is largely bedrock and resistant to erosion. There are a few sand and shell pocket beaches. The east side of Galiano Island is exposed to southeasterly and north-northwesterly storm waves and winds in the Strait of Georgia, and a few sections of shoreline on the south side of the island are slightly exposed to southwesterly storm winds and waves. There are a few areas of tidal sand or mudflats, which are sensitive to human disturbance. There were very few areas of saltmarsh bio-banding mapped in the 1990 Shorezone data.



**SEA CLIFF**

- rocky shore with steep slopes
- 32% of shoreline (26.1 Km)

**Rock (Hard) Shorelines**

**LOW ROCK/BOULDER**

- rocky shore with low slopes
- 54% of shoreline (43.6 Km)

**BLUFF**

- moderate to high slopes of sediment (often eroding)
- 0.4% of shoreline (0.3 Km)

**BOULDER/COBBLE**

- boulder - cobble cover on beach (often indicates eroding shoreline)
- 5% of shoreline (4.2 Km)

**PEBBLE/SAND**

- stable or accreting pebble-sand (or shell) beaches (may be eroding where sediment supply is interrupted).
- 7% of shoreline (5.5 Km)

**MARSH/FINE SEDIMENT**

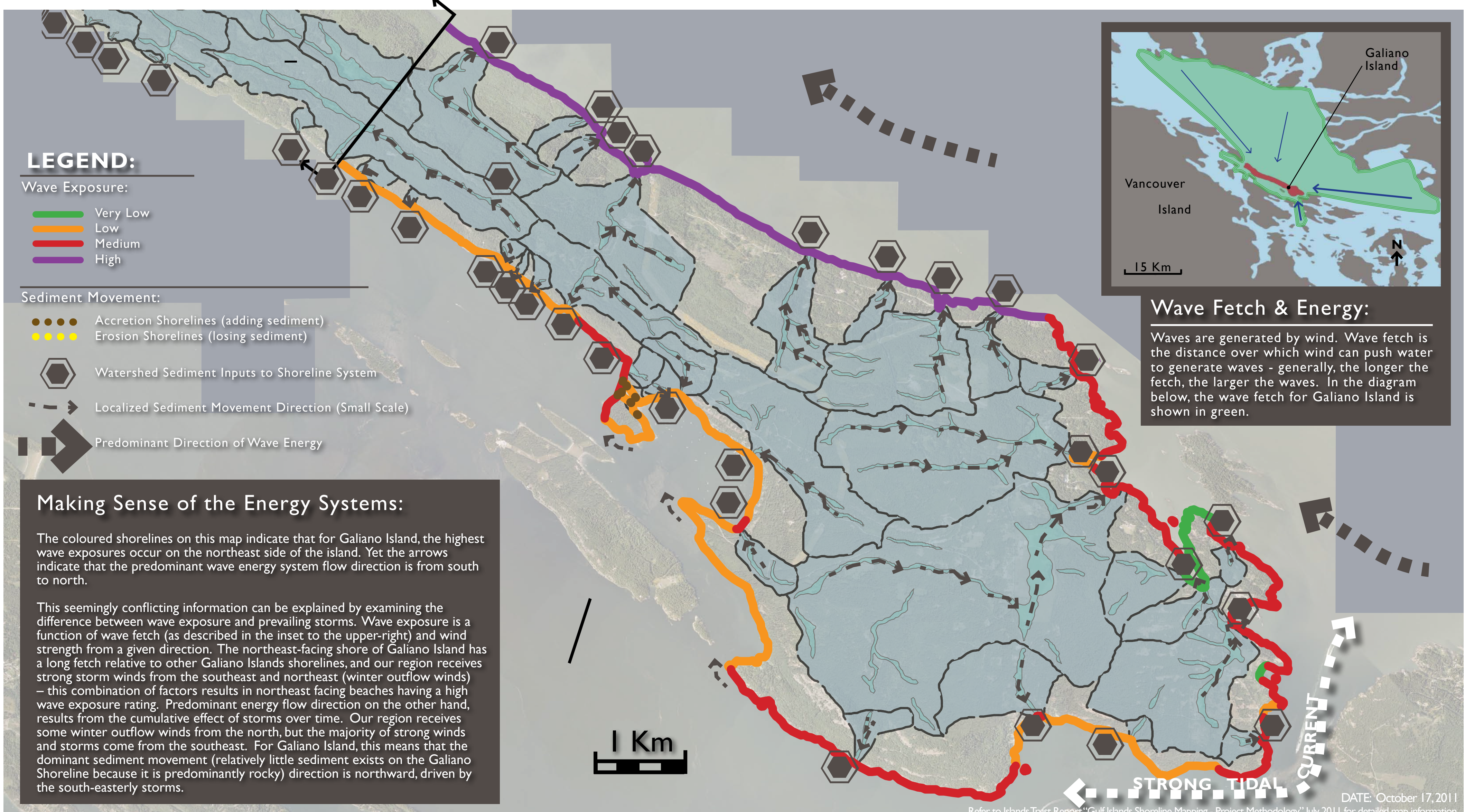
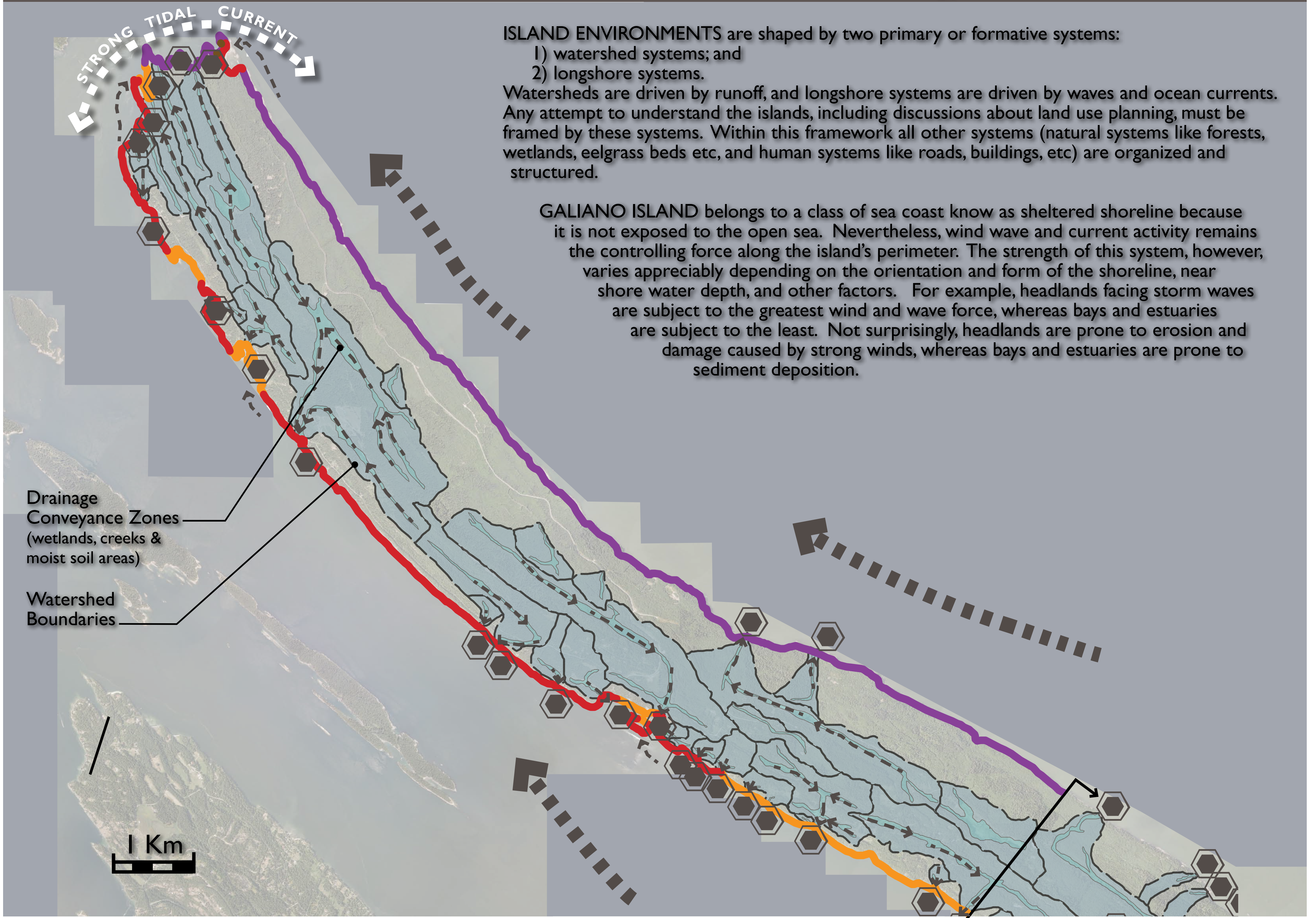
- low energy shorelines with sediment inputs from watersheds nearby
- 0.9% of shoreline (0.7 Km)

ISLAND ENVIRONMENTS are shaped by two primary or formative systems:

- 1) watershed systems; and
- 2) longshore systems.

Watersheds are driven by runoff, and longshore systems are driven by waves and ocean currents. Any attempt to understand the islands, including discussions about land use planning, must be framed by these systems. Within this framework all other systems (natural systems like forests, wetlands, eelgrass beds etc, and human systems like roads, buildings, etc) are organized and structured.

GALIANO ISLAND belongs to a class of sea coast know as sheltered shoreline because it is not exposed to the open sea. Nevertheless, wind wave and current activity remains the controlling force along the island's perimeter. The strength of this system, however, varies appreciably depending on the orientation and form of the shoreline, near shore water depth, and other factors. For example, headlands facing storm waves are subject to the greatest wind and wave force, whereas bays and estuaries are subject to the least. Not surprisingly, headlands are prone to erosion and damage caused by strong winds, whereas bays and estuaries are prone to sediment deposition.



### LEGEND:

#### Wave Exposure:

- Very Low
- Low
- Medium
- High

#### Sediment Movement:

- Accretion Shorelines (adding sediment)
- Erosion Shorelines (losing sediment)
- Watershed Sediment Inputs to Shoreline System
- Localized Sediment Movement Direction (Small Scale)
- Predominant Direction of Wave Energy

### Making Sense of the Energy Systems:

The coloured shorelines on this map indicate that for Galiano Island, the highest wave exposures occur on the northeast side of the island. Yet the arrows indicate that the predominant wave energy system flow direction is from south to north.

This seemingly conflicting information can be explained by examining the difference between wave exposure and prevailing storms. Wave exposure is a function of wave fetch (as described in the inset to the upper-right) and wind strength from a given direction. The northeast-facing shore of Galiano Island has a long fetch relative to other Galiano Islands shorelines, and our region receives strong storm winds from the southeast and northeast (winter outflow winds) – this combination of factors results in northeast facing beaches having a high wave exposure rating. Predominant energy flow direction on the other hand, results from the cumulative effect of storms over time. Our region receives some winter outflow winds from the north, but the majority of strong winds and storms come from the southeast. For Galiano Island, this means that the dominant sediment movement (relatively little sediment exists on the Galiano Shoreline because it is predominantly rocky) direction is northward, driven by the south-easterly storms.

### Wave Fetch & Energy:

Waves are generated by wind. Wave fetch is the distance over which wind can push water to generate waves - generally, the longer the fetch, the larger the waves. In the diagram below, the wave fetch for Galiano Island is shown in green.

### Accretion Shorelines:

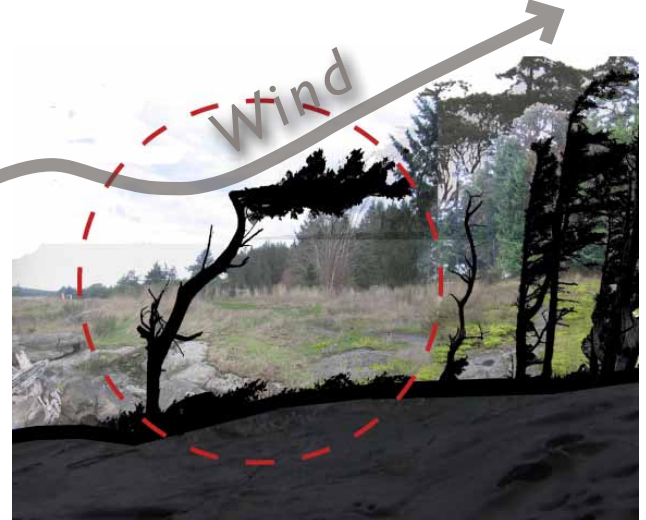
Sediment accumulation (accretion) is typically associated with lower energy environments along the shorelines.

Accretion features include sandy beaches, beach berms, pocket beaches or storm berms, and are often high value recreation features or wildlife habitats.

### Erosion Shorelines:

Eroding shorelines are typically associated with higher energy environments along the shorelines, like headlands, high exposure sediment shorelines or points of land.

Eroding shorelines feed the sediment transport system and halting erosion can have severe impacts on the shoreline sediment movement system and 'downstream' beaches. Adequate setbacks for buildings and facilities are critical.



Trees and vegetation damaged or shaped by the wind along shorelines are good indicators of high wind exposure.

Caution should be exercised when siting buildings and facilities in these locations to ensure they are adequately set back from the shoreline.

### Wave Exposure & the Sediment System

### Wind Exposure & Buildings

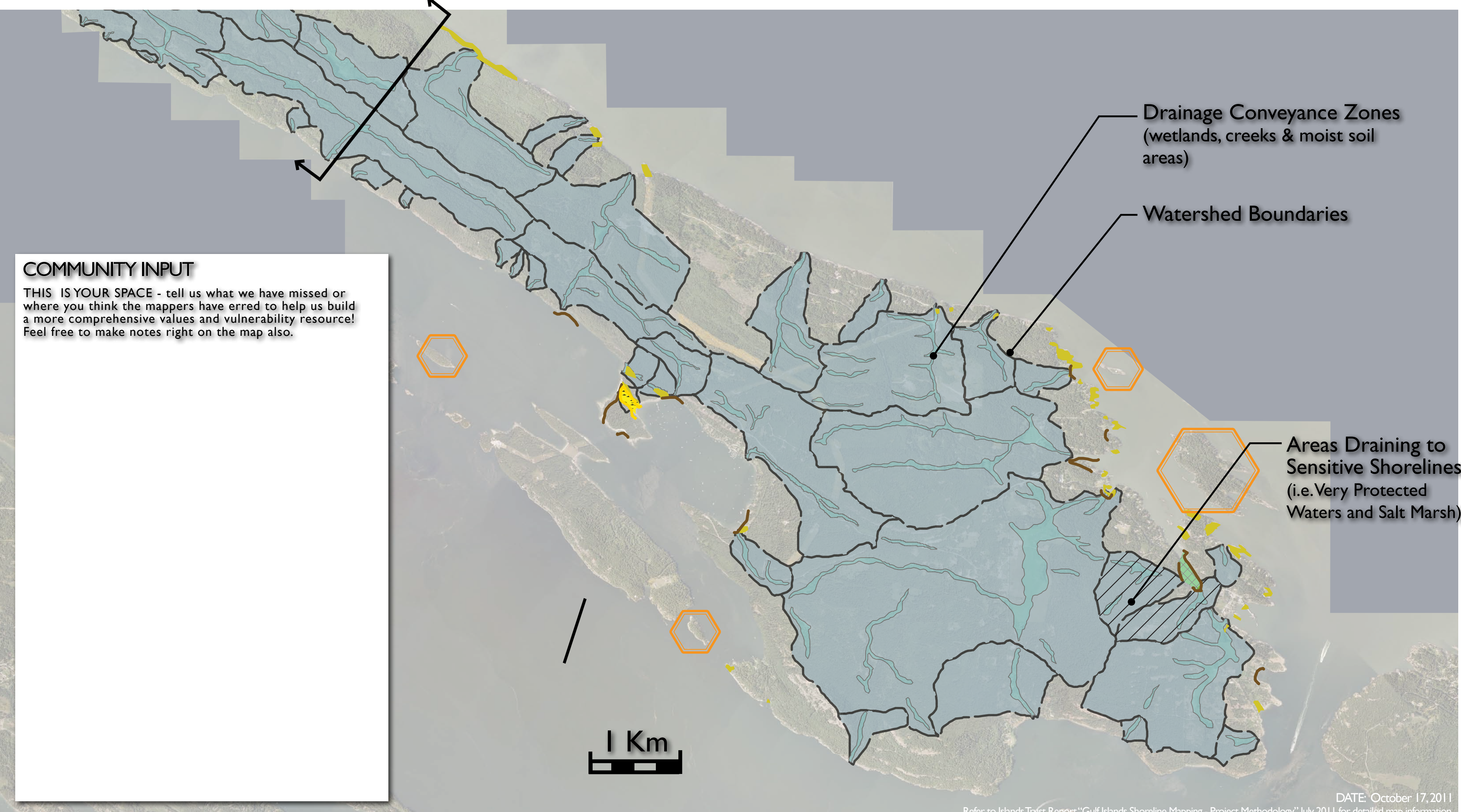
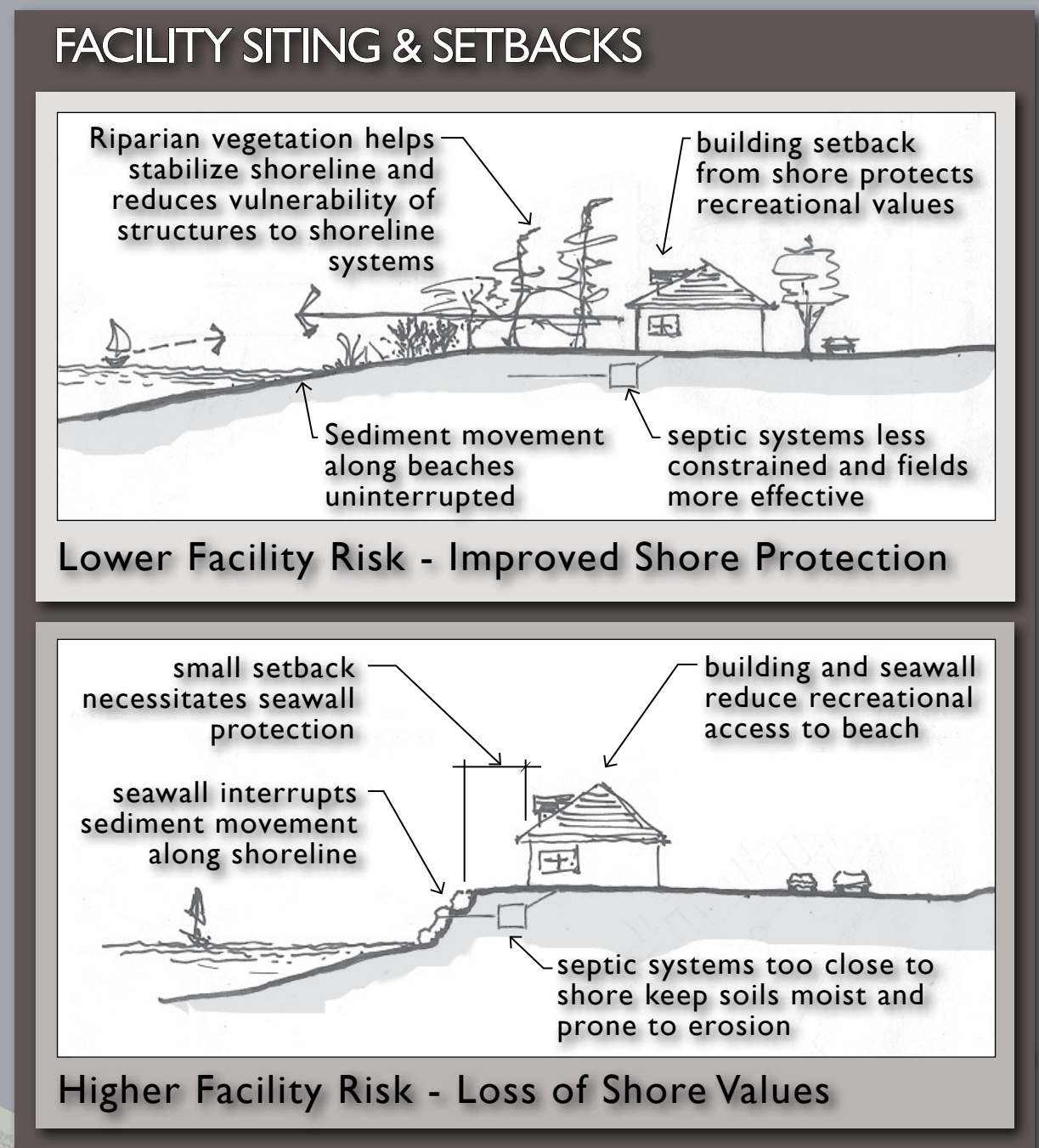
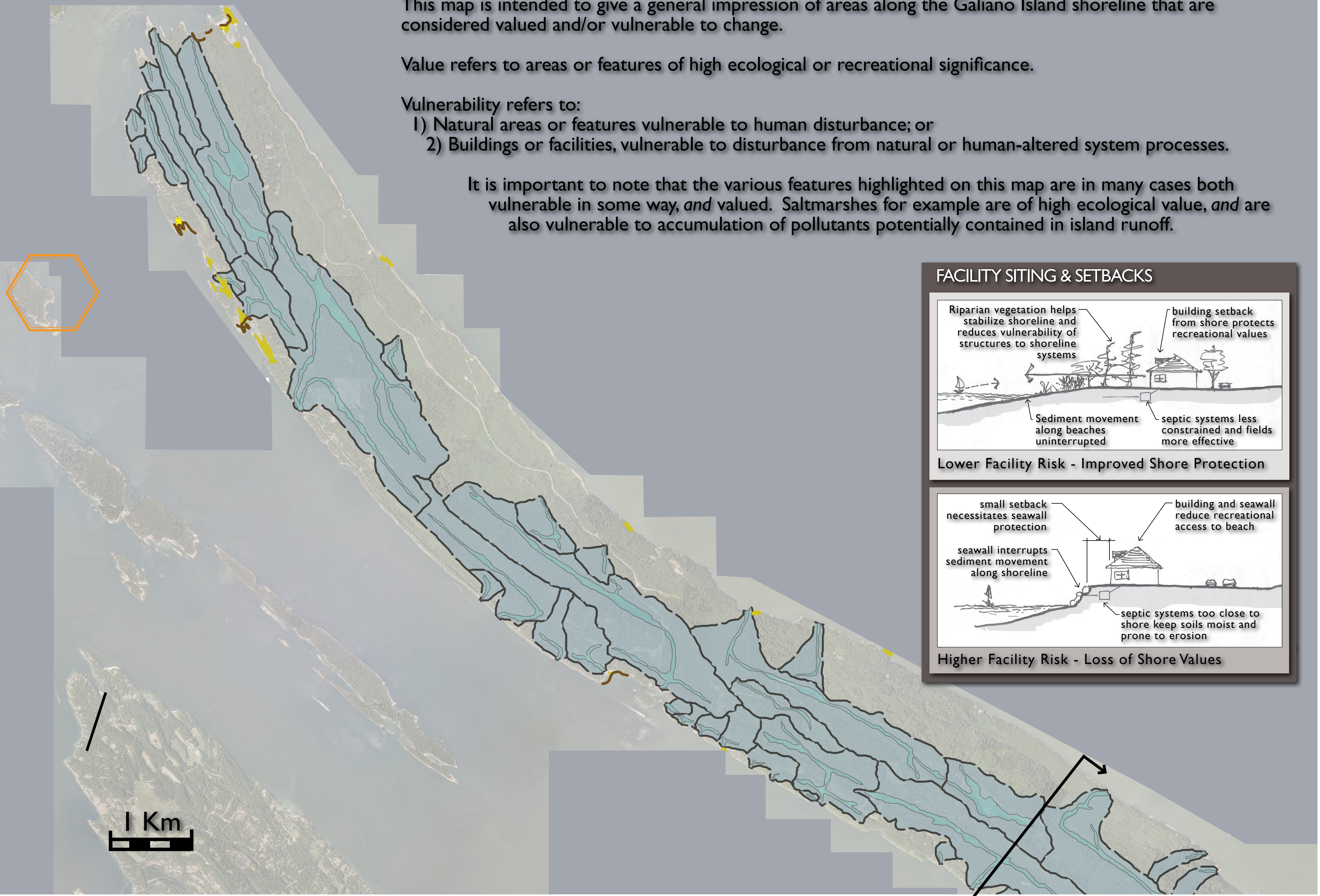
This map is intended to give a general impression of areas along the Galiano Island shoreline that are considered valued and/or vulnerable to change.

Value refers to areas or features of high ecological or recreational significance.

Vulnerability refers to:

- 1) Natural areas or features vulnerable to human disturbance; or
- 2) Buildings or facilities, vulnerable to disturbance from natural or human-altered system processes.

It is important to note that the various features highlighted on this map are in many cases both vulnerable in some way, *and* valued. Saltmarshes for example are of high ecological value, *and* are also vulnerable to accumulation of pollutants potentially contained in island runoff.



DATE: October 17, 2011  
 Refer to Islands Trust Report "Gulf Islands Shoreline Mapping - Project Methodology" July, 2011 for detailed map information.

<p><b>LOW LYING AREAS</b></p> <ul style="list-style-type: none"> <li>• Areas 0-4 m in elevation above existing Mean Sea Level and greater than 50 m of width from the shore are mapped as 'vulnerable' to sea level rise.</li> </ul> <p>Current BC Provincial Government guidelines suggest up to 1 metre of sea level rise over the next 100 years (<a href="http://www.env.gov.bc.ca">www.env.gov.bc.ca</a>). Sea level rise may cause increased shoreline vulnerability to land-based activities by causing such effects as increased flooding in low lying areas or softening of sediment shorelines and increased shoreline erosion. These effects could be further exacerbated by storm surges and changing climatic conditions.</p>	<p><b>SOFT SHORELINES</b></p> <ul style="list-style-type: none"> <li>• Sediment shorelines are typically associated with high recreational values and high ecological values (pocket beaches, estuaries, etc).</li> </ul>	<p><b>VERY PROTECTED WATERS</b></p> <ul style="list-style-type: none"> <li>• Shorelines highly protected from wave exposure</li> <li>• Poor water circulation increases vulnerability to water pollution</li> </ul>	<p><b>SALT MARSH</b></p> <ul style="list-style-type: none"> <li>• Valued ecological features</li> <li>• Vulnerable to pollution from land-based activities</li> </ul>	<p><b>ISLETS</b></p> <ul style="list-style-type: none"> <li>• Often important ecologically, islets can be vulnerable to disturbance from recreational users</li> </ul>
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### Areas of High Ecological or Recreational Significance