PORT ACTIVITY AND ENDANGERED SPECIES: POSSIBLE BANK SWALLOW

COHABITATION CHALLENGE OVERCOME

A PILOT PROJECT OF THE QUÉBEC PORT AUTHORITY (QPA)

PORT QUÉBEC

ON S'ENGAGE
WE'RE COMMITTED

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BANK SWALLOW (RIPARIA RIPARIA)

This insectivorous bird is drawn to sand and gravel pits, sand and earth heaps, and sandy banks alongside bodies of water and roads.

Bank swallows usually burrow nest holes into the faces of nearly vertical slopes (70 degrees or more) more than 2 m off the ground.

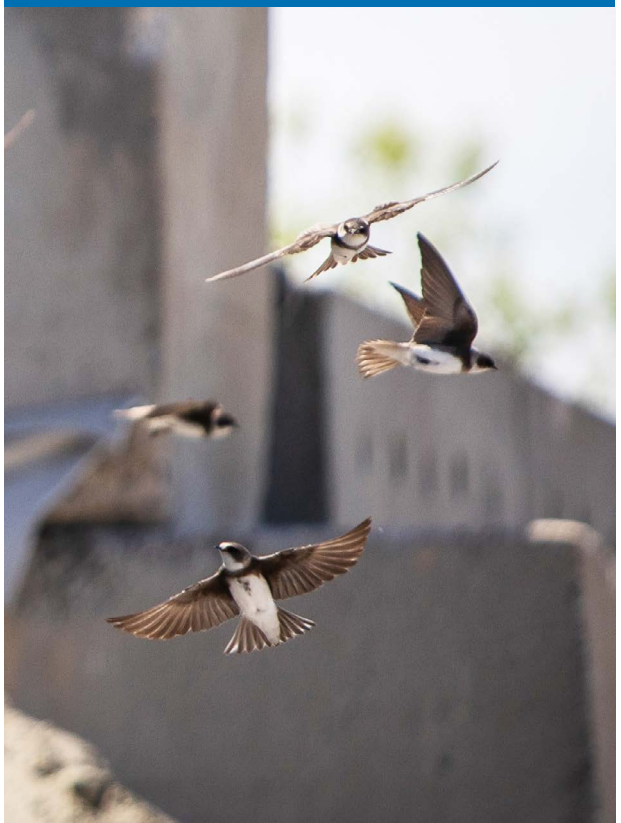
As a rule, they use these nesting sites from mid April to late August. This is a sensitive period, during which the birds are at higher risk of harm.

Source: *https://www.canada.ca/fr/environnement-changement-climatique/services/conservation-oiseaux-migrateurs/publications/hirondelle-rivage-riparia-sablieres-gravieres.html)*

Migratory bird in decline, whose Canadian population has dropped by

98%

over the last 40 years.

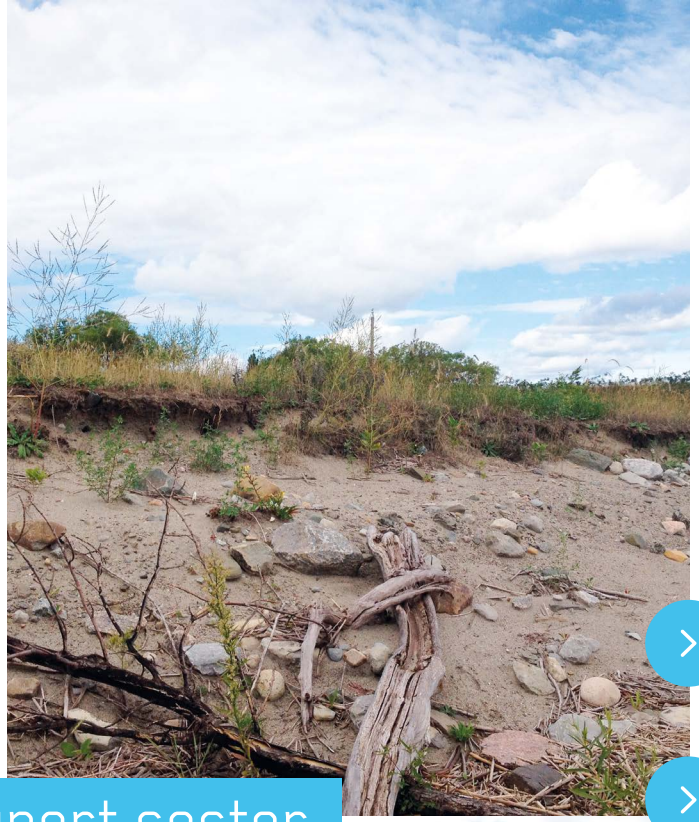


IBA QC-107

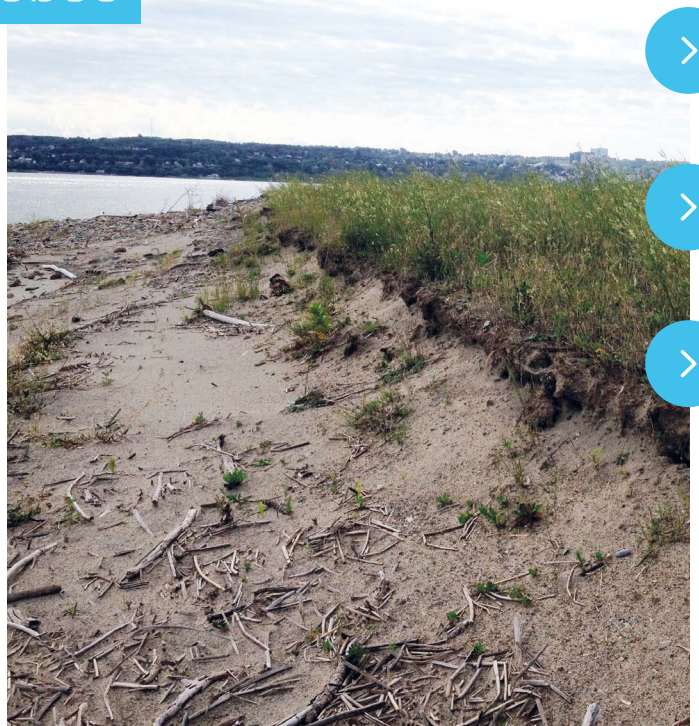
Battures de Beauport
and chenal de l'île d'Orléans

IBA = Important Bird Area
QC-107 = classification of the Battures de Beauport IBA

BANK SWALLOW OBSERVATIONS IN 2014



Colony in the Beauport sector, at the Port of Québec



In 2014, the sharp decline in the bank swallow population was brought to the attention of the Québec Port Authority (QPA).

The QPA studied the situation within a carefully defined area, and made the following observations:

- Beauport beach near the port was occupied by a small colony with fewer than 30 burrows.
- The habitat was very exposed to weather.
- There were many signs of predation at burrow entrances.
- The habitat was atypically low to the ground.
- The locations were probably colonized due to a lack of alternate sites because of the artificialization of area shores.

CURRENT STATE OF THE EXISTING COLONY LOCATION

Signs of predation in the natural habitat in 2014

Here, signs of predation are clearly visible on the burrows dug in the natural habitat.

Holes enlarged by predators, with claw marks at hole entrances.

Habitat is very low to the ground, which exposes it to tides and weather as well as predators.

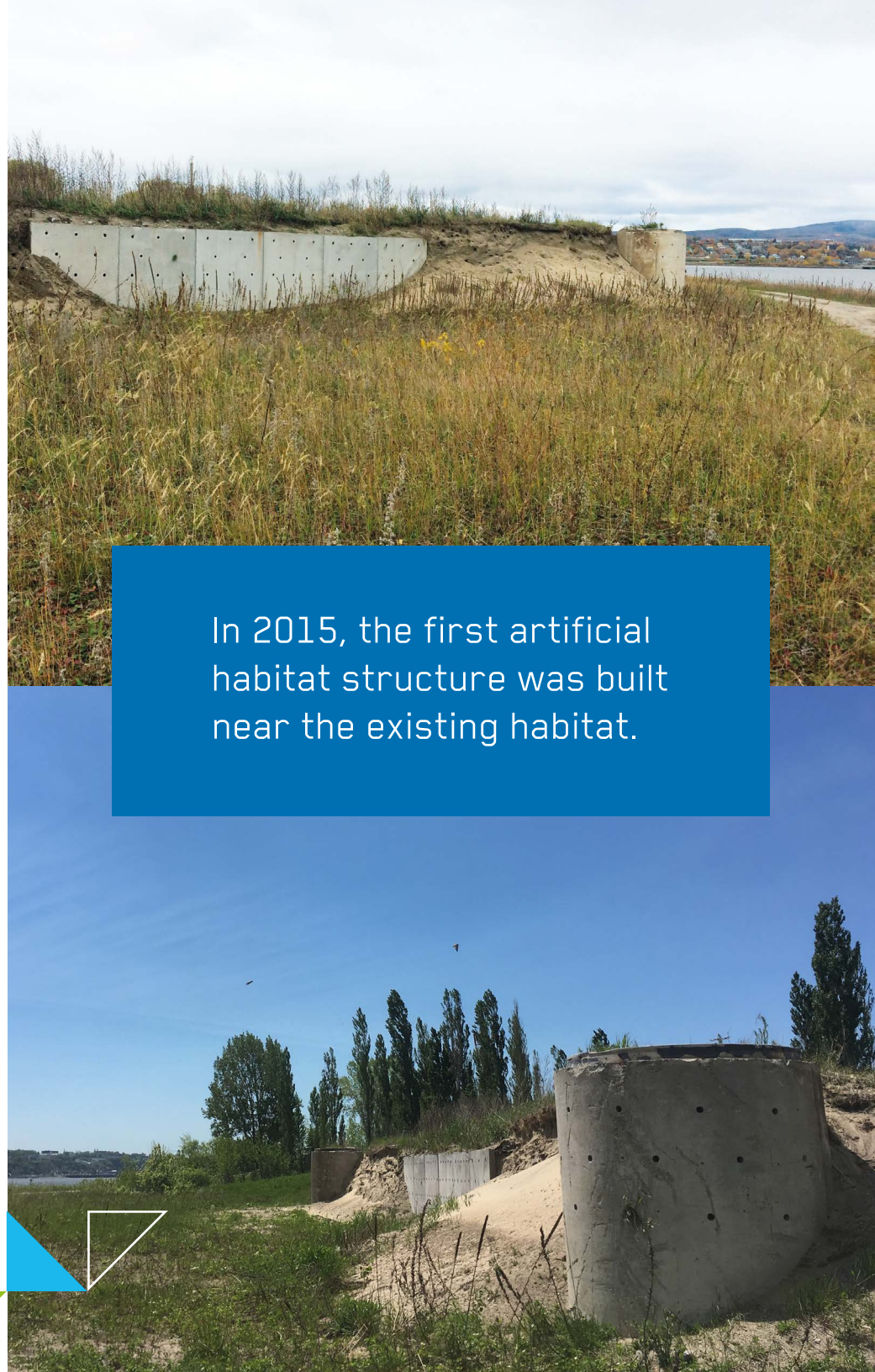
QPA PILOT PROJECT
HELPING OUT THE SWALLOWS

The pilot project's conditions:

- Nesting structures compatible with industrial port activities.
- Nesting structures that can be moved.
- Minimal maintenance of nesting structures.
- Flexible and adjustable design.

A phased project:

Based on the results of the first artificial habitat structure, a second one will be constructed in the recreational area of Beauport Bay.



In 2015, the first artificial habitat structure was built near the existing habitat.

FIRST STRUCTURE, 2015

Proposed solutions:

A.

Concrete walls with premade holes.
Technical aspects are illustrated on page 9.

B.

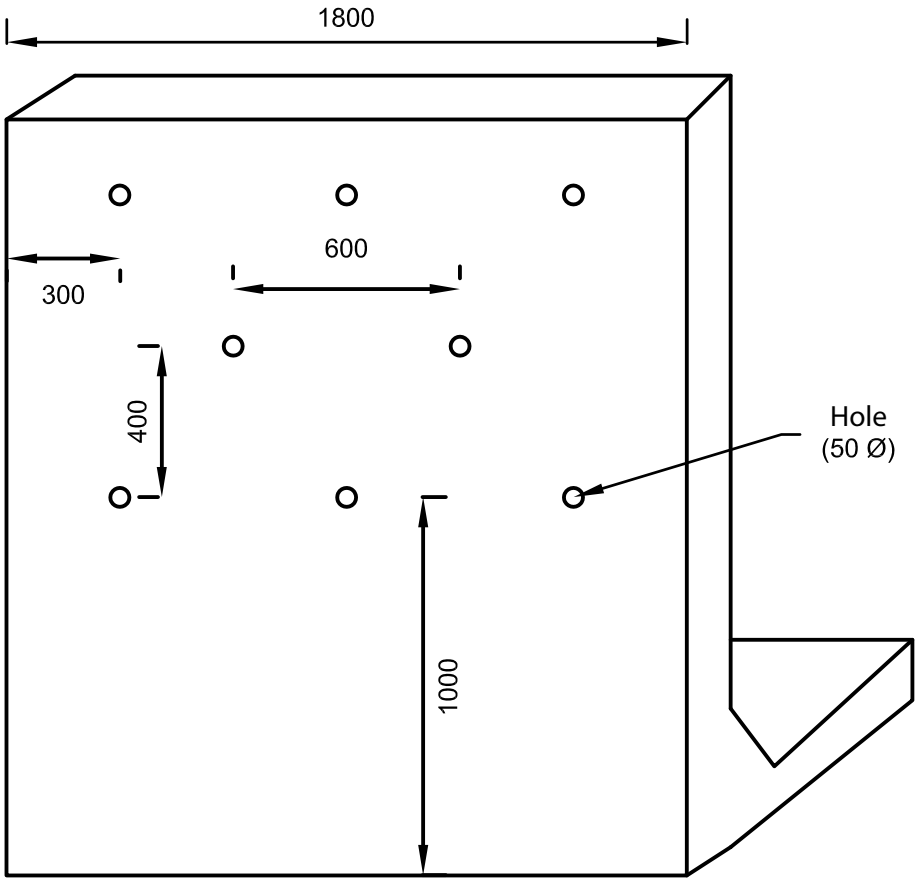
Vertical concrete pipes with premade holes.

C.

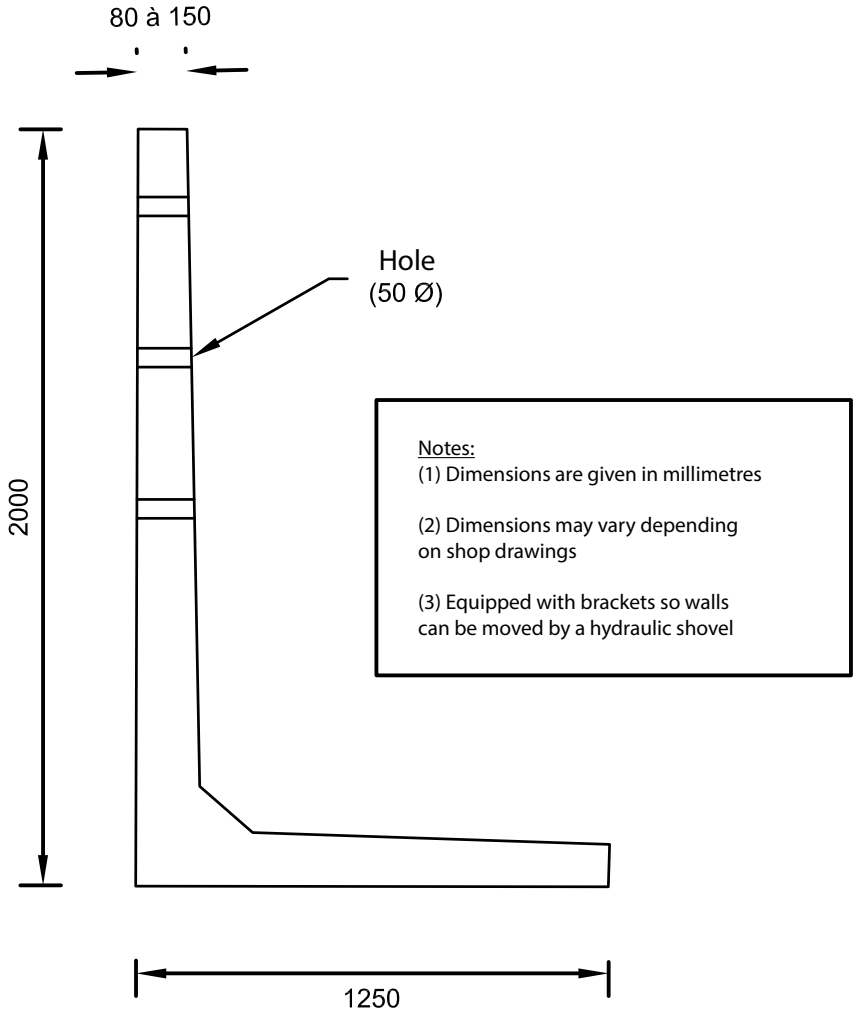
First of its kind in North America! Design inspired by engineered nesting structures in Europe.

Engineered vertical sand banks *(since there was no guarantee that the swallows would nest in the concrete).*

DETAILS OF PREFABRICATED CONCRETE WALL



FRONT VIEW



SIDE VIEW

Notes:
(1) Dimensions are given in millimetres

(2) Dimensions may vary depending on shop drawings

(3) Equipped with brackets so walls can be moved by a hydraulic shovel

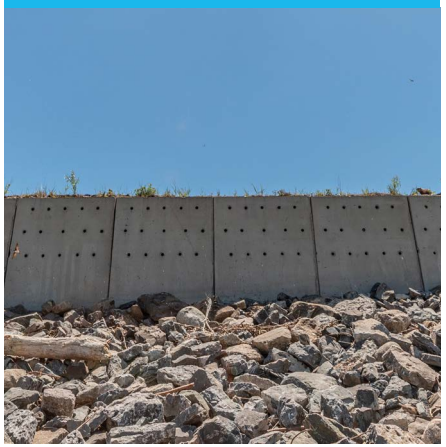
Scale 1:20

SECOND STRUCTURE, 2018

Useful lessons learned and technical fine-tuning

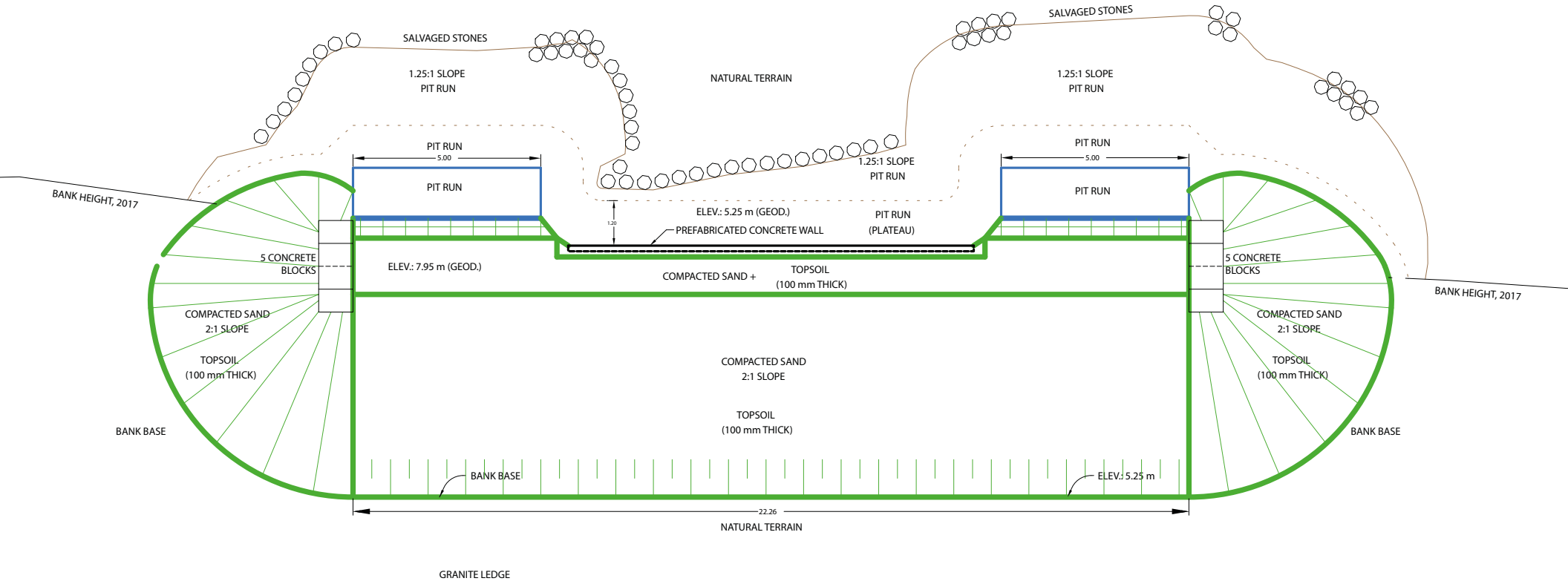
Since the pre-pierced vertical concrete pipes were little used in the first structure, this feature was not incorporated into the 2018 structure.

The sand banks were smaller than those of the 2015 structure, in order to encourage use of the concrete walls.



The premade holes in the concrete walls were clustered more densely than in the initial 2015 structure.

PLAN OF THE 2018 STRUCTURE



NOTE: PLAN DIMENSIONS ARE IN METRES

A LOOK AT THE 2018 STRUCTURE

A HEALTHY ARTIFICIAL HABITAT

Protection the swallows appreciate

Similar results have been observed from year to year. The swallows have systematically abandoned the natural habitat in favor of the QPA structures.

Why? Because the QPA nesting structures have clear advantages over the natural habitat.

Advantages of the engineered structures:

- A screen covers the back of the sand bank, providing protection against terrestrial predators.
- With the concrete structures, the nests are higher off the ground, which makes them less accessible to predators.
- The structure is stable, decreasing the risk of slopes collapsing.

2018: **OVERALL OBSERVATIONS SINCE THE BEGINNING OF THE PROJECT**

We have learned an enormous amount

Since the first structure was installed (2015), all the swallows have nested in the artificial habitat. But what have we learned from their new living environment?

- At first, the swallows preferred the sand banks, which are more similar to their natural habitat.
- In 2018, the majority of them nested in the concrete walls.
- The concrete pipes saw little use.
- The size of the colony has grown from 30 burrows observed in 2014 to more than 134 nests confirmed in 2018.

USE OF NATURAL AND ENGINEERED HABITATS

LOCATION	TYPE OF NEST STRUCTURE	NUMBER OF NESTS **2014**	NUMBER OF NESTS **2015**	NUMBER OF NESTS **2016**	NUMBER OF NESTS **2017**	NUMBER OF NESTS **2018**
EXISTING HABITAT	Sandy beach	30	0	0	26	0
STRUCTURE 1 (SINCE 2015)	Wall of sand	-	59	78	63	0
	Pre-pierced concrete wall	-	0	17	48	56
	Pre-pierced concrete pipe	-	0	0	7	7
STRUCTURE 2 (SINCE 2018)	Wall of sand	-	-	-	-	12
	Pre-pierced concrete wall	-	-	-	-	59
TOTAL		**30**	**59**	**95**	**144**	**134**

USE OF NATURAL AND ENGINEERED HABITATS (CONTINUATION)

OUR ANALYSIS

Pre-pierced concrete wall
The number of broods has been stable since 2017. While no swallows nested in the concrete wall during the first year, the colony has preferred the concrete walls since then, with more than 80% of the swallows choosing to nest there.

Unstable walls of sand
The shift away from sand walls is likely due to the fact that such slopes collapse easily. Maintaining a good slope is difficult, because sand does not compact well.

Forget concrete pipes
As mentioned above, concrete pipes had the least promising results. They were not used in the second structure.

A poor natural habitat
Since the first structure was built, there have been no productive nests in the natural habitat. In 2017, some early efforts at burrows were observed, but they were abandoned over the course of the nesting season.

This summer, very high tides left significant sand deposits. Of the past six years, this is the only one when the natural habitat has been well suited to bank swallow nesting.

2018 REVIEW
OF NEW SITE

SWALLOW BEHAVIOUR AND REPRODUCTION

Over **80%** of the colony nested in the concrete walls.

The swallows seem to have adapted to the available space and to see the concrete walls as an appropriate nesting site.

Average of **5** eggs per nest

70% of eggs laid hatch

40% increase in colony population

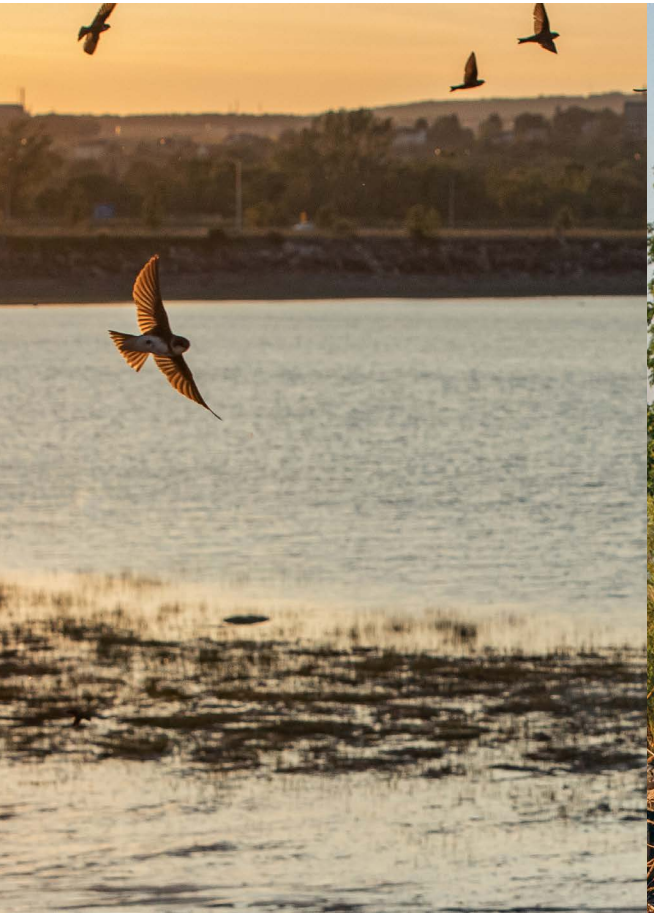
REVIEW OF PILOT PROJECT

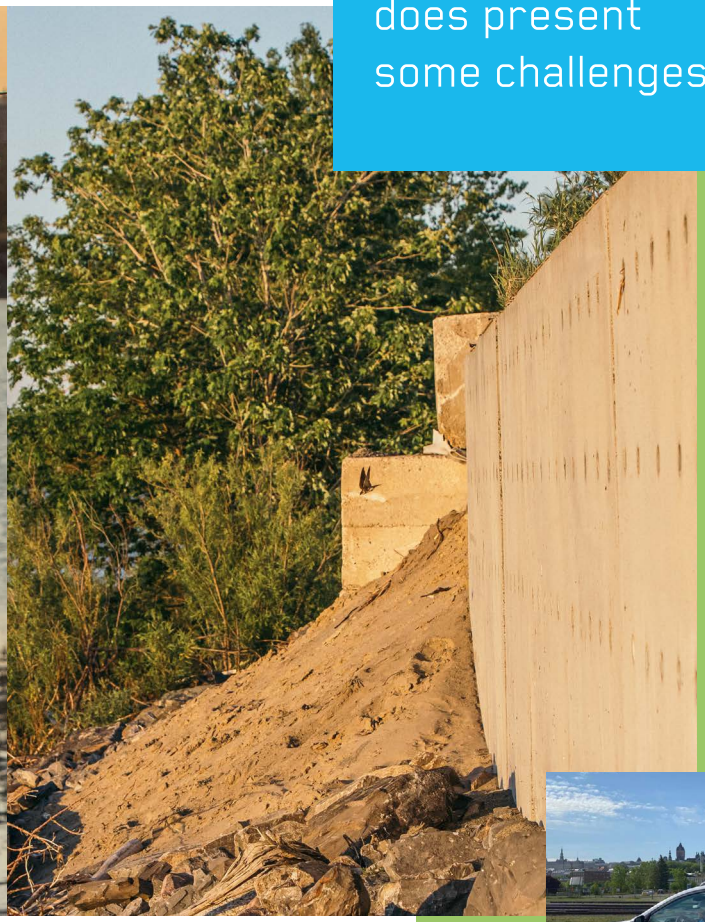
Promising results

- To our knowledge, this is the first time that concrete nesting structures have been demonstrated to be effective in Canada.
- The colony's numbers have increased substantially.
- Concrete nesting structures require minimal maintenance, protect burrows from terrestrial predators and provide a more stable habitat for the swallows.
- The Beauport colony prefers the concrete wall type of structure, but it is impossible to state whether this will be true in all situations.

ISSUES
TO CONSIDER

Setting up a replacement habitat right next to a port area does present some challenges.





Increased erosion
Nesting structures at the edge of a beach are exposed to erosion and tides.

Human activity
Curious users of Beauport Bay may potentially disturb the colony.

- Accordingly, a fence and warning signs were installed to limit colony disturbances.
- Our security agents also provide some surveillance of the facilities.

BECAUSE **COHABITATION IS POSSIBLE!**

LISTENING TO OUR ENVIRONMENT

UNDERSTANDING OUR ENVIRONMENT (DATA)

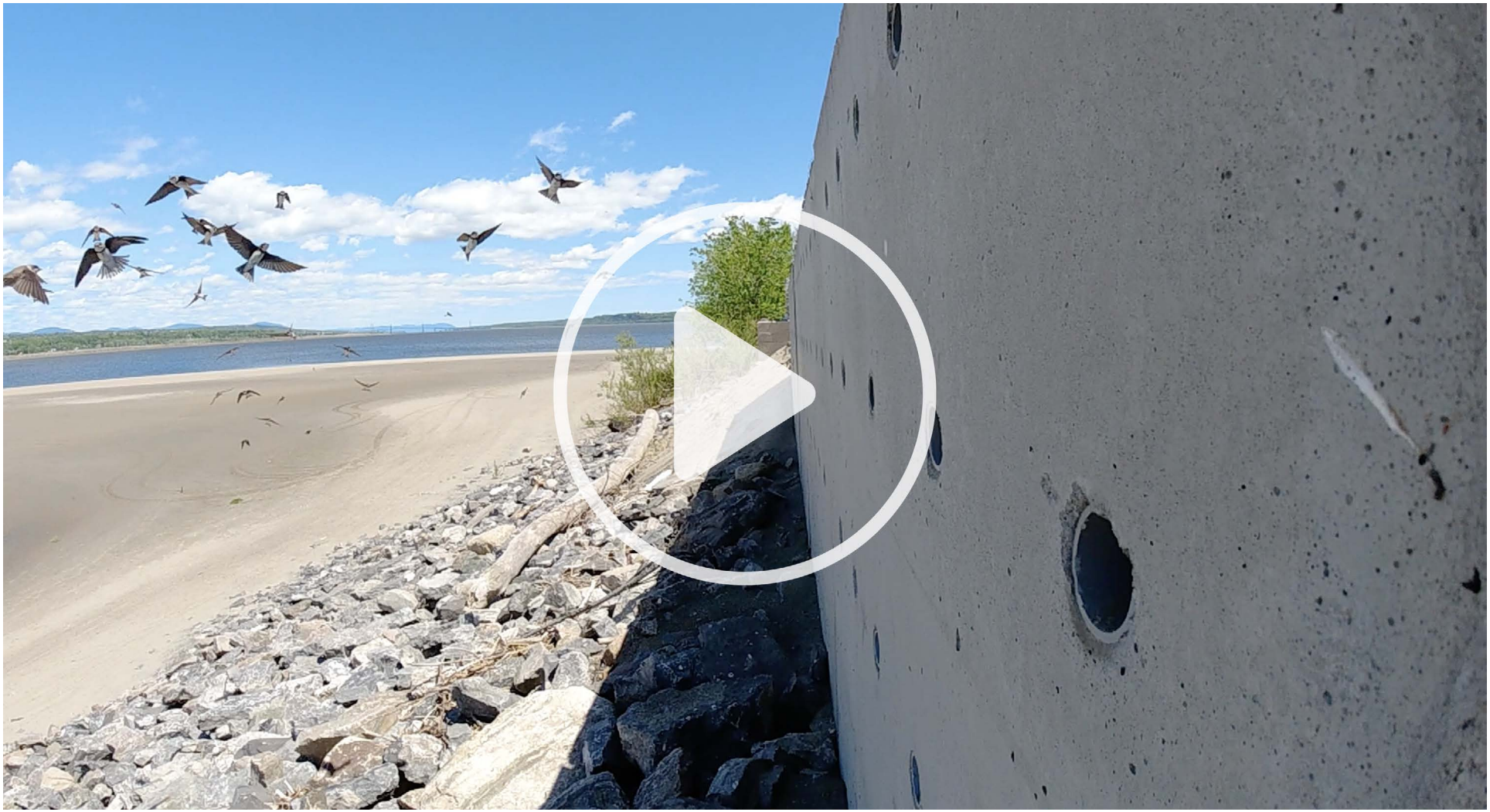
LEADING THE WAY

This QPA pilot project has shown that cohabitation is possible between heavy industrial activity and the conservation of area wildlife.

COHABITATION

FOR YOUR VIEWING PLEASURE

Enjoy this video showing our colony of bank swallows in the middle of nesting season, in summer 2019.



FOR MORE INFORMATION ON THE QPA'S PILOT PROJECT, PLEASE FEEL FREE TO CONTACT:

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