



Hutchinson

Environmental Sciences Ltd.

Sensitive Habitat Inventory Mapping (SHIM) of Lac La Biche

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What is Sensitive Habitat Inventory Mapping (SHIM)?

- ▶ Characterizes habitat value of a lake's shore so that it can be protected during shoreline development
- ▶ SHIM approach developed in BC where it has been applied to 15 lakes so far
- ▶ In 2016 Living Lakes Canada and partners initiated the Lac La Biche SHIM, which represents the first use of the method outside BC

Why Lac La Biche?

SHIM applicable to Lac La Biche, because:

- ▶ Community concerns about declines in water quality and fish populations
 - blue-green algal blooms
 - Fishery closures (Walleye)
- ▶ Lac La Biche Watershed Management Plan (2009) recommended mapping sensitive habitat for land use planning



Approach

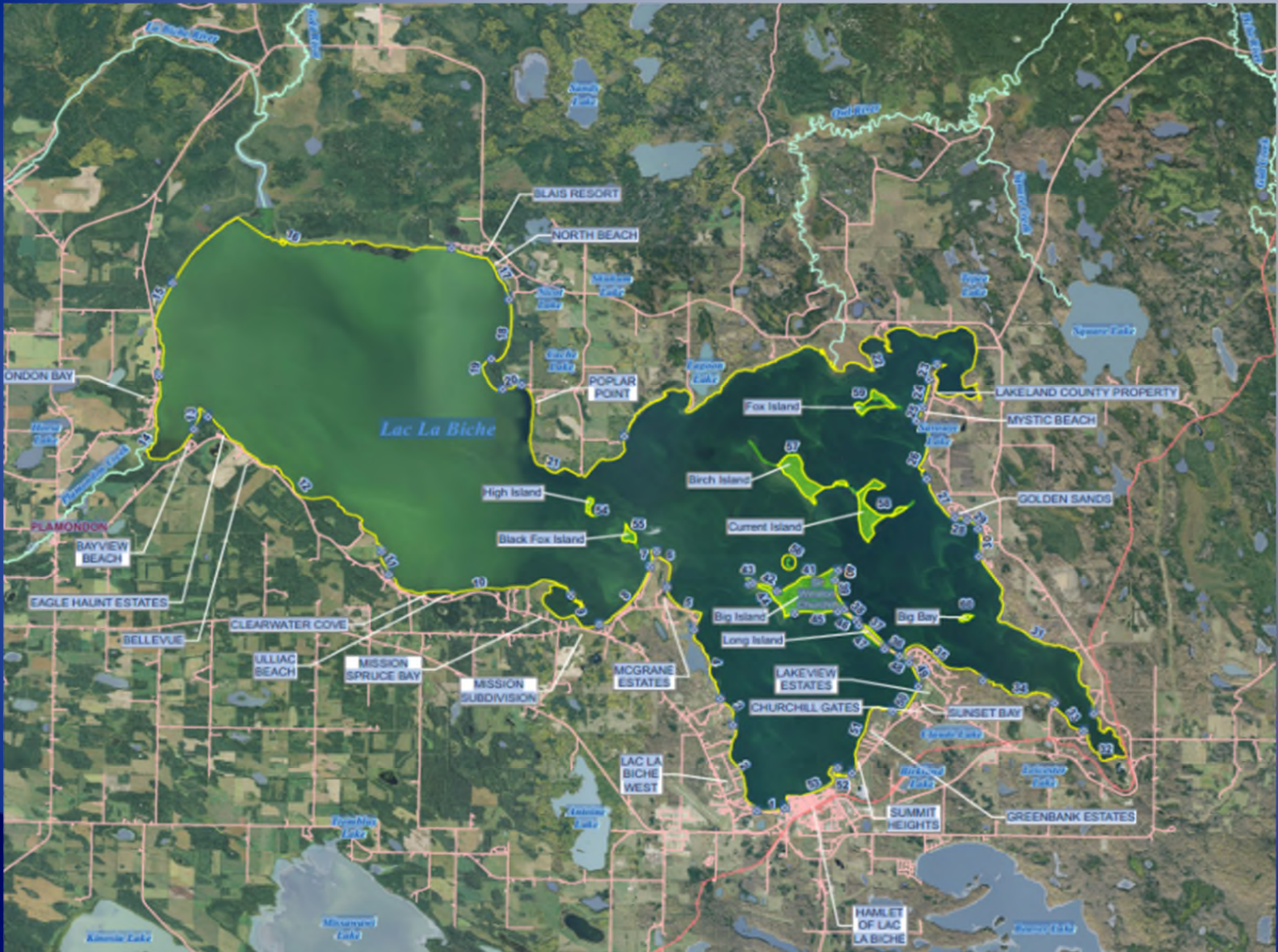


- ▶ Field Work, Background Review
- ↓ Data Analysis, Mapping
- ▶ Aquatic Habitat Index, Zones of Sensitivity
- ↓
- ▶ Activity Risk
- ↓
- ▶ Shoreline Development Guidelines

Field Work

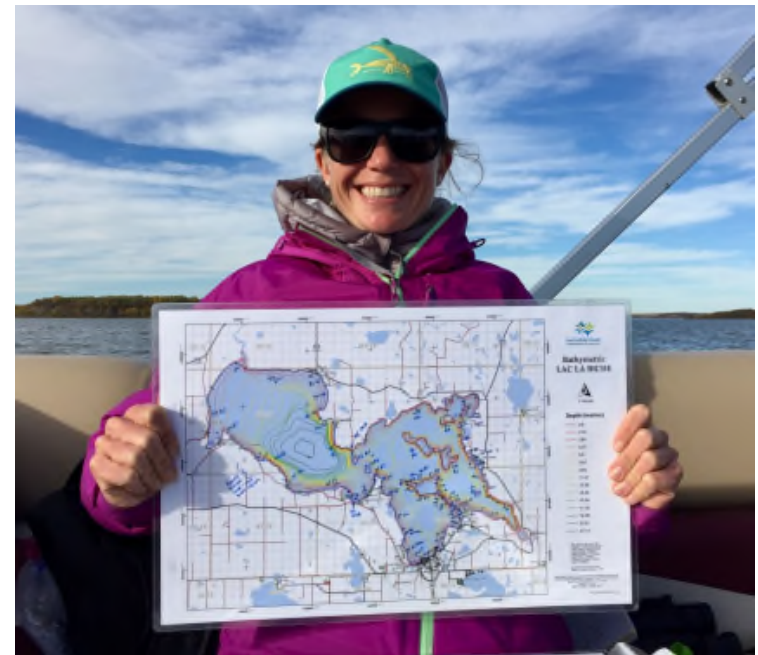
- ▶ July, September 2016
- ▶ Data collected by boat with GPS
- ▶ High water mark to 100 m offshore
- ▶ Information collected included:
 - Shore type (e.g., rocky, gravel, sand, wetlands)
 - Littoral vegetation (% coverage) and substrate
 - Incidental observations of plants and wildlife
 - Land use (e.g., residential, commercial, natural area)
 - Modifications (e.g., docks, boat launches, retaining walls)
- ▶ 60 Segments – divided shoreline based on changing characteristics





Background Review

- ▶ Desktop review to supplement field data
- ▶ Local, provincial, and federal sources
 - Fish and wildlife
 - Plant communities
 - Aquatic habitat
 - Land use
 - Bathymetry



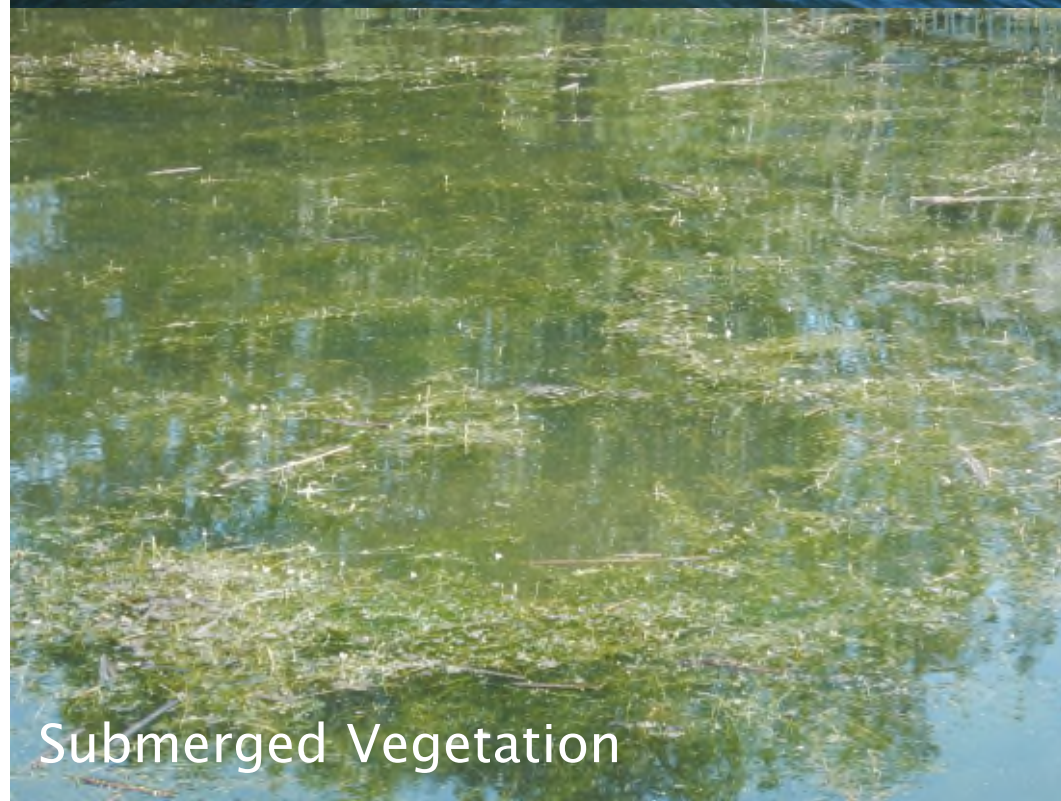
Aquatic Habitat Index

- ▶ Assessed each segment based on parameters of shoreline health
 - Natural habitat features: positive scores
 - Anthropogenic structures: negative scores
- ▶ Parameters weighted according to their contribution to habitat value
- ▶ Ranked shoreline segments based on total score
- ▶ Divided into 4 classes

Forested Shore



Sandy Substrate

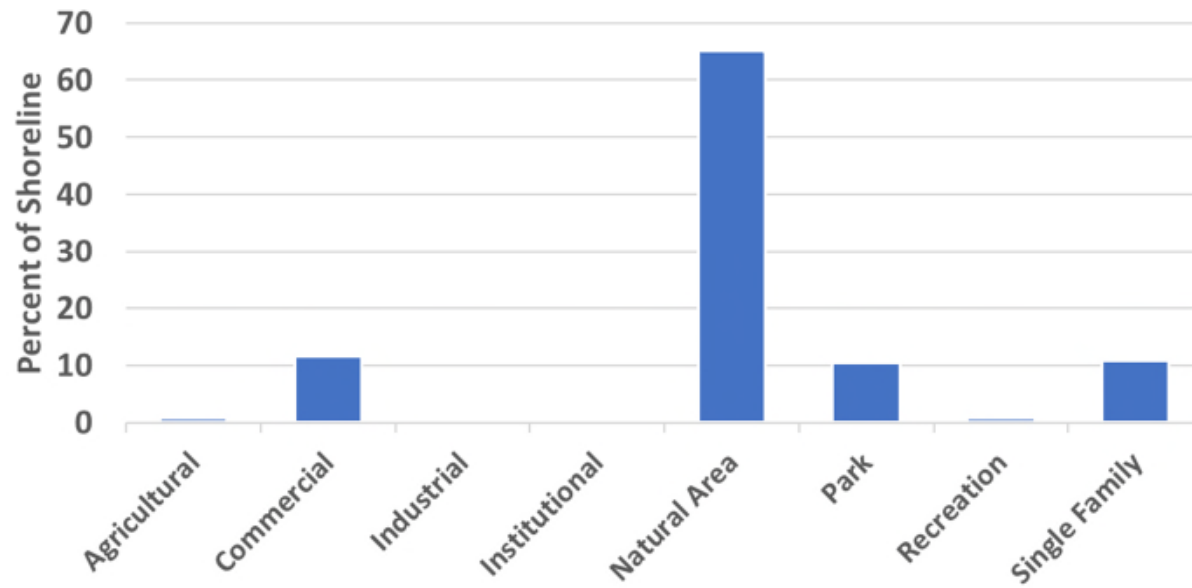


Submerged Vegetation

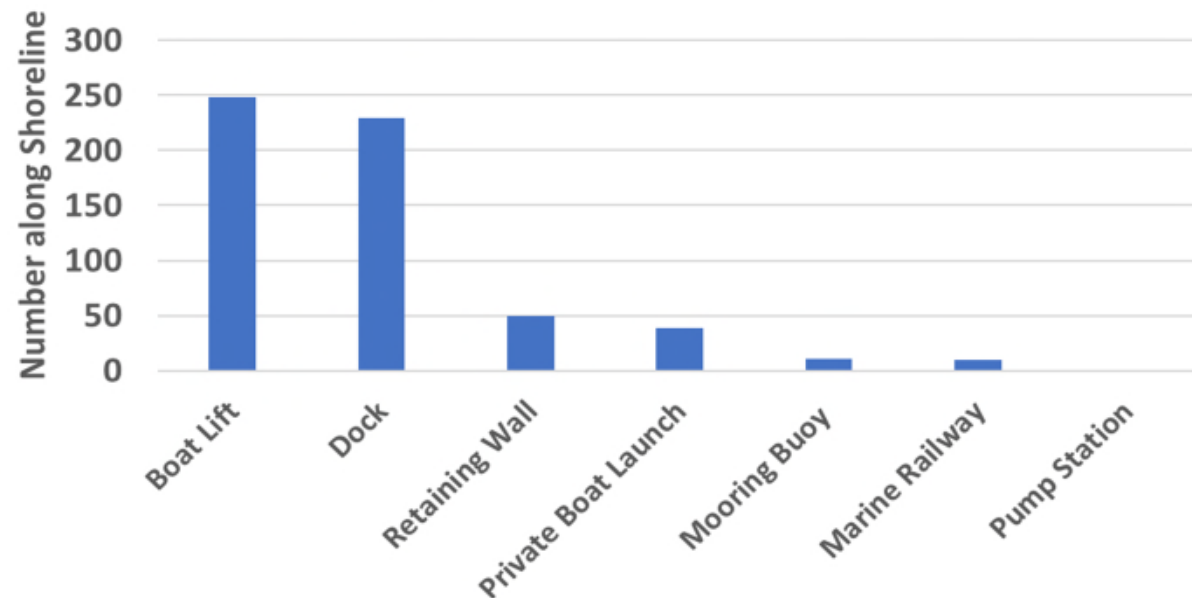


Emergent Vegetation

Land Use



Shoreline Modification Structures



Aquatic Habitat Index

No. of
Segments

Aquatic Habitat Index Value

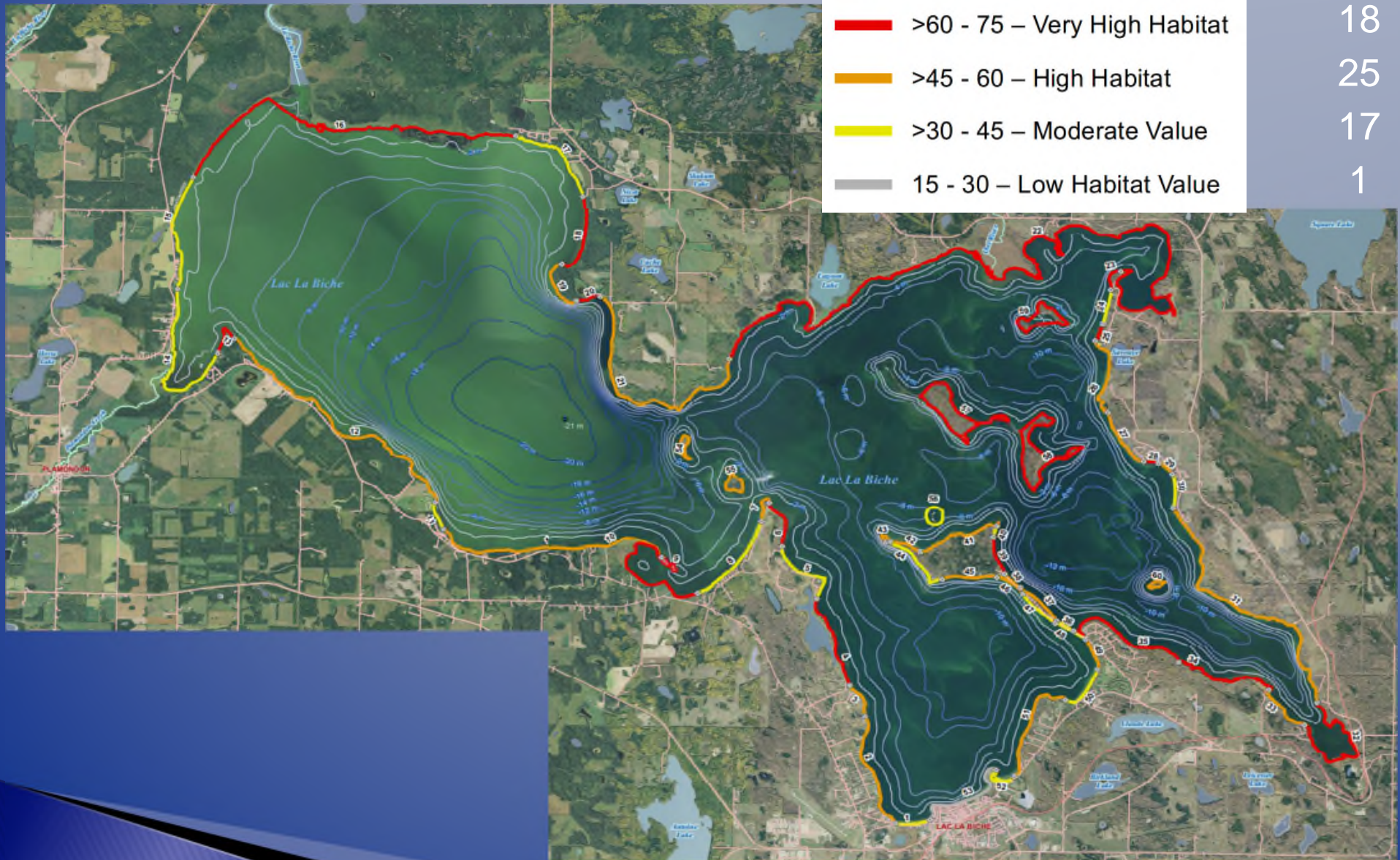
—	>60 - 75 – Very High Habitat
—	>45 - 60 – High Habitat
—	>30 - 45 – Moderate Value
—	15 - 30 – Low Habitat Value

18

25

17

1



HESL

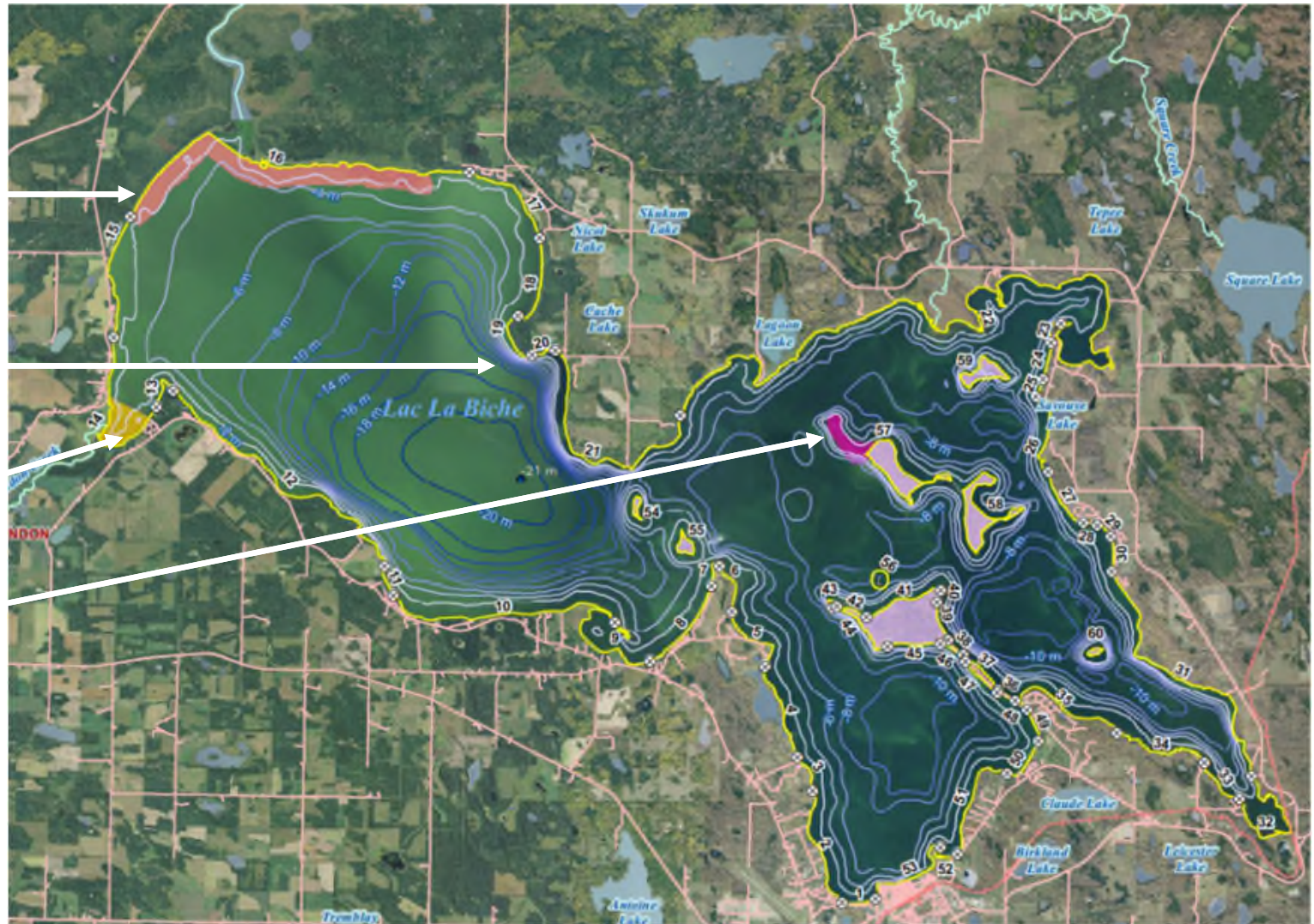
Zones of Sensitivity

- ▶ Some sensitive features of Lac La Biche were not sufficiently valued by Aquatic Habitat Index
 - Wetlands
 - Shoals
 - Protected areas
 - Colonial bird breeding habitat
- ▶ Incorporated into SHIM as Zones of Sensitivity



Zones of Sensitivity

- ▶ La Biche River Fen
- ▶ Spawning Shoal
- ▶ Plamondon Wetland
- ▶ Bird Sanctuary



Activity Risk Matrix

Activity	Aquatic Habitat Index				Modifier
	Red	Orange	Yellow	Grey	Zone of Sensitivity
Aquatic vegetation removal	H	H	H	M	H
Beach creation above HWM	H	H	M	M	H
Beach creation below HWM	H	H	H	H	H
Boat house (below HWM)	H	H	H	M	H
Boat launch upgrade	H	H	H	H	H
Boat lift - temporary	M	M	L	L	H
Docks	Refer to DFO Guidance, dock type, etc.				
Dredging	H	H	H	H	H
Dredging - maintenance/previously approved	H	H	H	H	H
Elevated boardwalk below HWM	H	M	M	M	H
Erosion protection (hard engineered)	H	H	H	M	H
Erosion protection (soft bioengineered)	H	M	L	L	H
Foreshore sediment disturbance and removal of lakebed substrates	H	H	M	M	H
Infill	H	H	H	H	H
New boat launch	H	H	H	H	H
Over water-piled structure (i.e. building, house, etc.)	H	H	M	M	H
Public beach maintenance	M	L	L	L	M
Septic application	Refer to residential permitting requirements				
Installation of treated effluent discharge pipe	H	H	M	M	H
Upland vegetation removal	H	M	M	M	H
Waterline drilled	H	M	L	L	H
Waterline trenching	H	H	H	M	H

High Risk (H):

- likely negative impacts
- difficult to mitigate

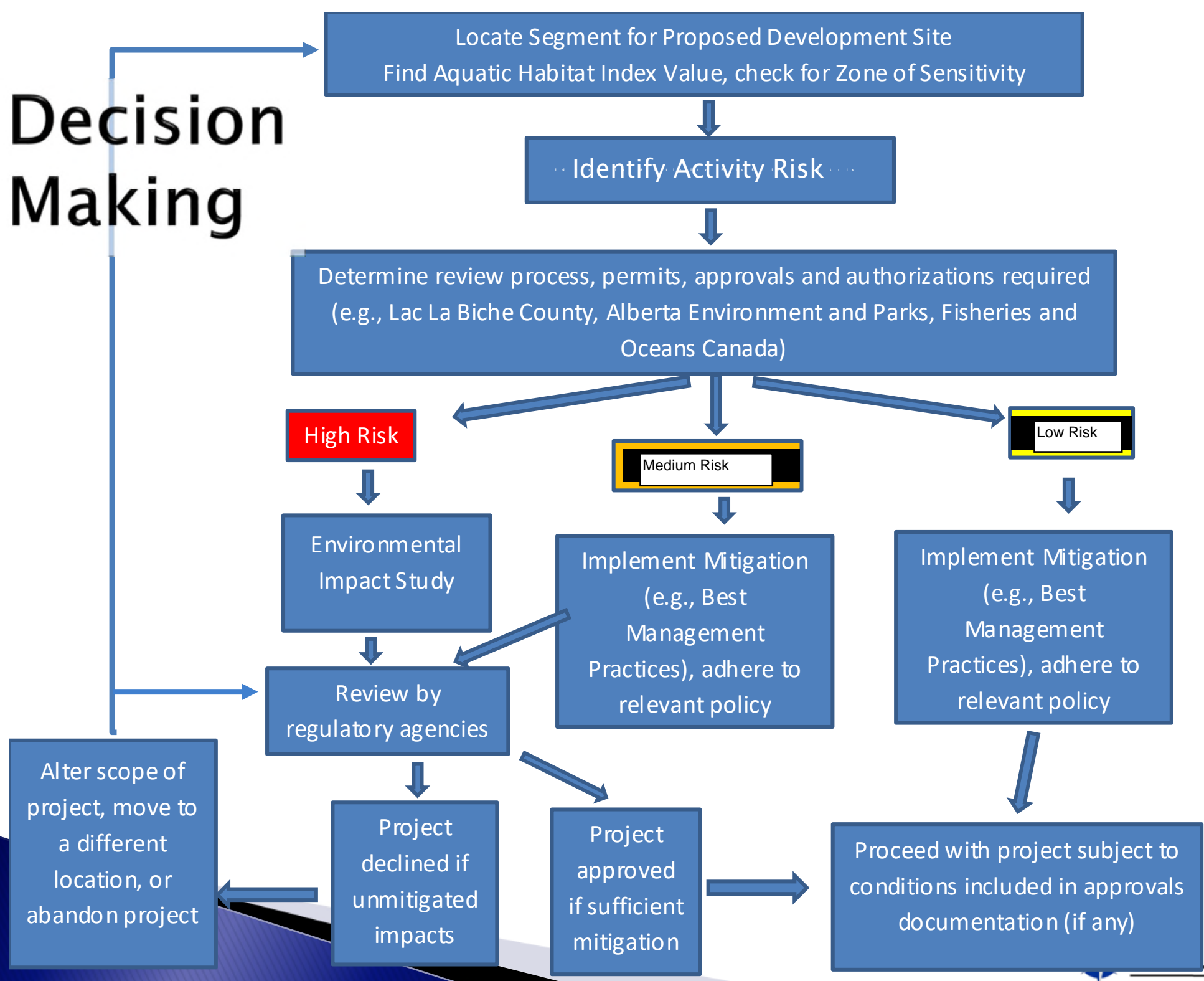
Medium Risk (M):

- Potential negative impacts
- possible to mitigate

Low Risk (L):

- limited negative impacts
- easy mitigation

Decision Making



Conclusions

- ▶ Lots of high-value habitat present at Lac La Biche
- ▶ Local considerations in SHIM protocol
 - Zones of Sensitivity require extra protection
 - Algal blooms – BMPs to avoid further eutrophication
 - Walleye – protection of species-specific habitat
- ▶ SHIM results will support decision making on lakeshore developments using site-specific scientific information on shoreline health

Acknowledgements

- ▶ County of Lac La Biche:
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Questions?

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