



Data Capture Specifications for Large Scale Hydrographic Features

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Background of Study

What?

- Hydrographic features at a large scale (1:2000 - 1:5000)

When and Why?

- October 2010 to March 2011
- To meet the needs of the Province of Ontario, Conservation Authorities, and other agencies



Background of Study continued



Approvals process in Ontario

Ministry of Natural Resources

- Fisheries Act
- Planning Act
- Conservation Authorities Act
- etc.

Background of Study continued

Who?



How?

- Attribution and digitizing specific large scale features from various sources

Limitations of Capture

- Limited to the extent of visible surface water and associated features
- Wetlands
- New data capture projects
- Snapshot in time

This document is an extension of the medium scale document produced by Ontario Ministry of Natural Resources in 2010.



Hydrographic features

Feature Class	Feature Type
Watercourse (line)	<ul style="list-style-type: none"> • Stream (default) • Conduit • Culvert • Ditch • Tidal stream • Constructed drain • Virtual flow • Virtual connector • Other
Waterbody (polygon)	<ul style="list-style-type: none"> • Lake (default) • Canal • Reservoir • River • Tidal river • Liquid waste • Pond • Beaver pond • Side channel • Ocean • Other
Additional Features (point, line, polygon)	
Crossing Structures	<ul style="list-style-type: none"> • Bridge/Overpass* • Culvert* • Ford • Pipe/Inlet/Outlet/Outfall
In-stream Obstacles or Irregularities	<ul style="list-style-type: none"> • Waterfall • Rapids • Rock(s) • Island(s) • Spring • Exposed shipwreck • Fish ladder • Sink/Karst Feature
Flow Barriers	<ul style="list-style-type: none"> • Lock gate/Water gate • Dam • Beaver dam • Weir/Sluice gate • Sea lamprey barrier • Other fish barrier • Embankment • Berm/Retaining wall • Pumping station
Shoreline Features	<ul style="list-style-type: none"> • Reef • Wharf/Pier/Dock • Dry dock • Boat ramp/Slip • Artificial headland/Jetty / Groyne • Curved, stepped, or rip-rap seawall/Headwall • Offshore breakwater/ Breakwall



Scale considerations

Table 2: Horizontal scale and accuracy criteria

Accuracy (at 90% confidence)		Map Scale
Absolute	Relative	
1.00 m	0.40 m	1:2,000
2.50 m	1.00 m	1:5,000

Table 3: Vertical scale and accuracy criteria (LMAS)

Accuracy (at 90% confidence)		Contours	Map Scale
Absolute	Spot Elevations		
0.50 m	0.30 m	1.0 m	1:2,000
1.25 m	0.50 m	2.0 m	1:5,000

Absolute – positional accuracy of features relative to their true-world coordinates

Relative – positional accuracy of features relative to nearby features



Feature dimensions and scale

Table 4: Scale and feature dimensions criteria

Map Scale	Vertex Spacing (minimum)	Feature Separation (minimum)	Closed Line Length* (min.)	Open Line Length (min.)	Polygon Width (Threshold)
	<i>a</i>	<i>b</i>		<i>c</i>	<i>d</i>
1:2,000	0.50 m	3.00 m		12.00 m	4.00 m
1:5,000	1.00 m	7.50 m		30.00 m	10.00 m

* **Note:** Closed Line Length is directly related to the DEM resolution (e.g., a 2 m x 2 m DEM will have a *b* value of ~3 m for 1:2,000 map scale). Please refer to Appendix B for more information.

a - spacing of vertices defining a single line or polygon

b - map scale references physical representation of (paper) product while min. feature separation describes the corresponding digital representation

- closed line length – determines whether a line feature is long enough to be captured – closed refers to line features connected to other features at both ends

c - line features connected at only one end (headwater stream) or unconnected (sink hole)

d - whether a feature is captured as polygon or line

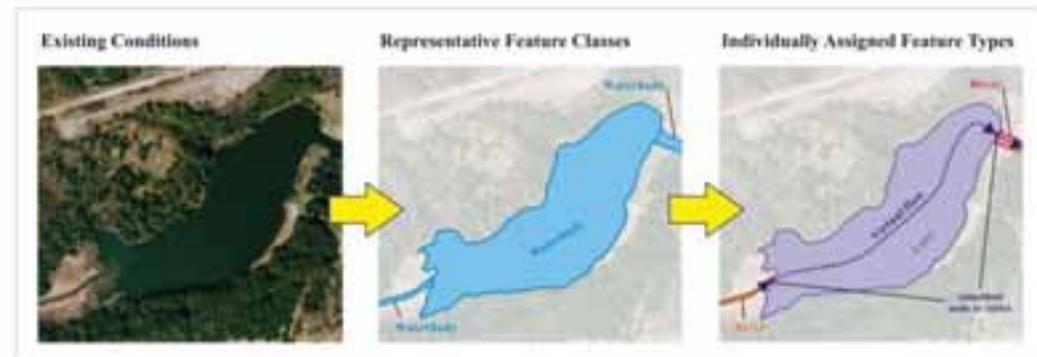
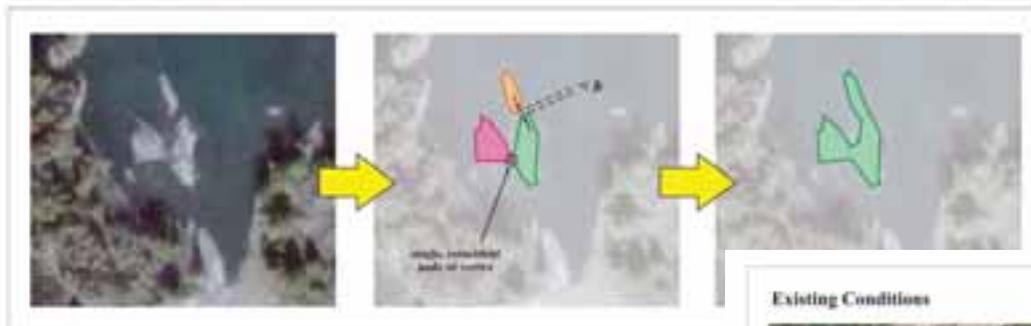


Feature dimensions and scale

Table 4: Scale and feature dimensions criteria

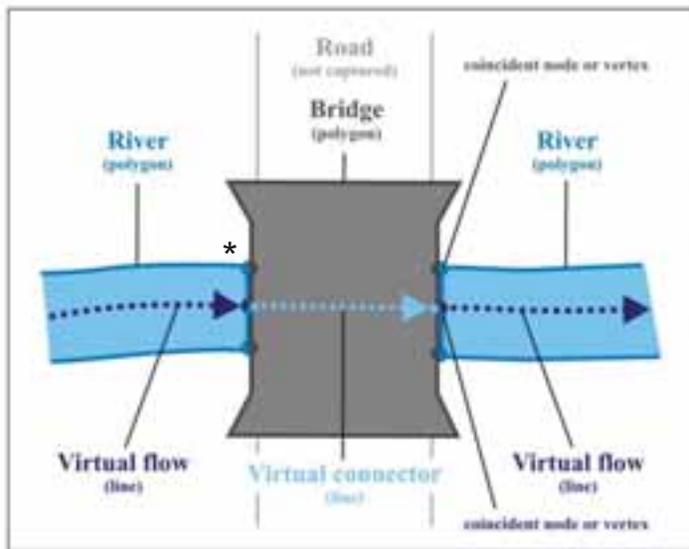
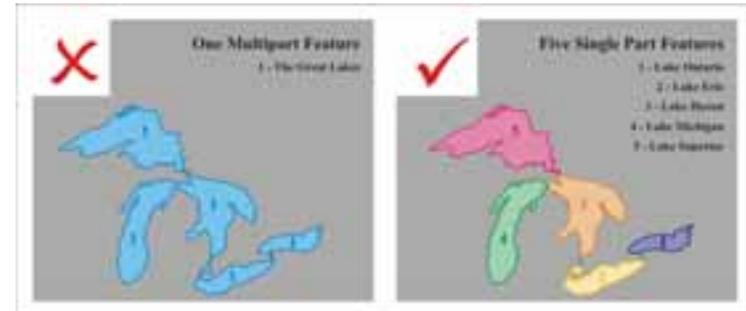
Map Scale	Vertex Spacing (minimum)	Feature Separation (minimum)	Closed Line Length* (min.)	Open Line Length (min.)	Polygon Width (Threshold)
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1:5,000	1.00 m	7.50 m		30.00 m	10.00 m

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Generic capture rules

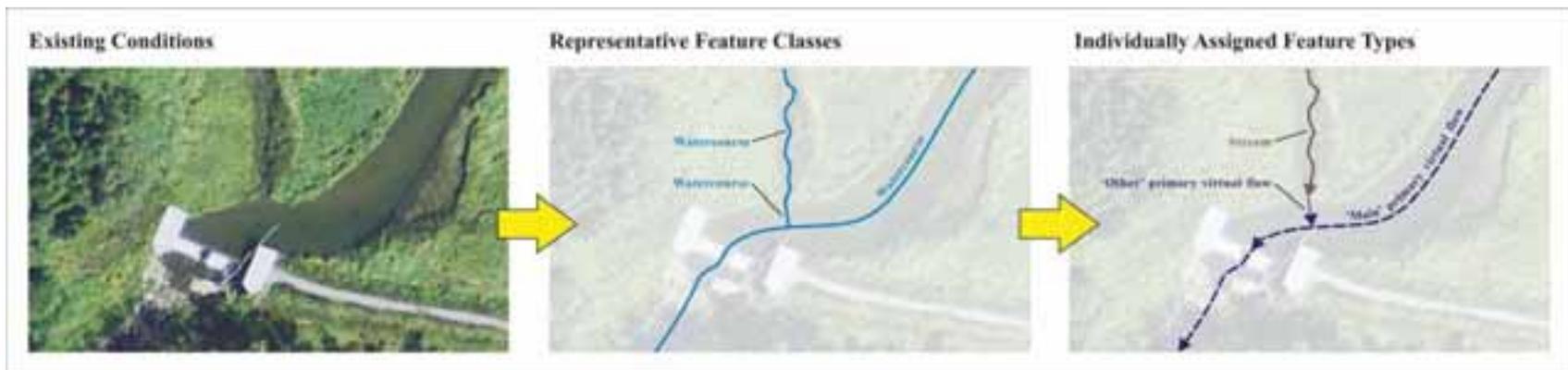
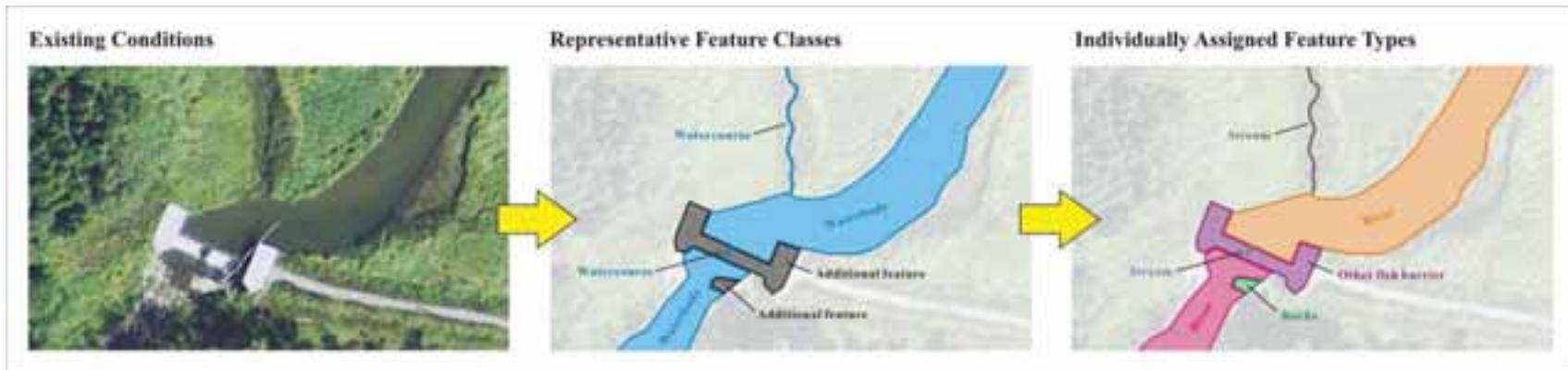
- Required (and optional) attributes
- Z values
- Topology...



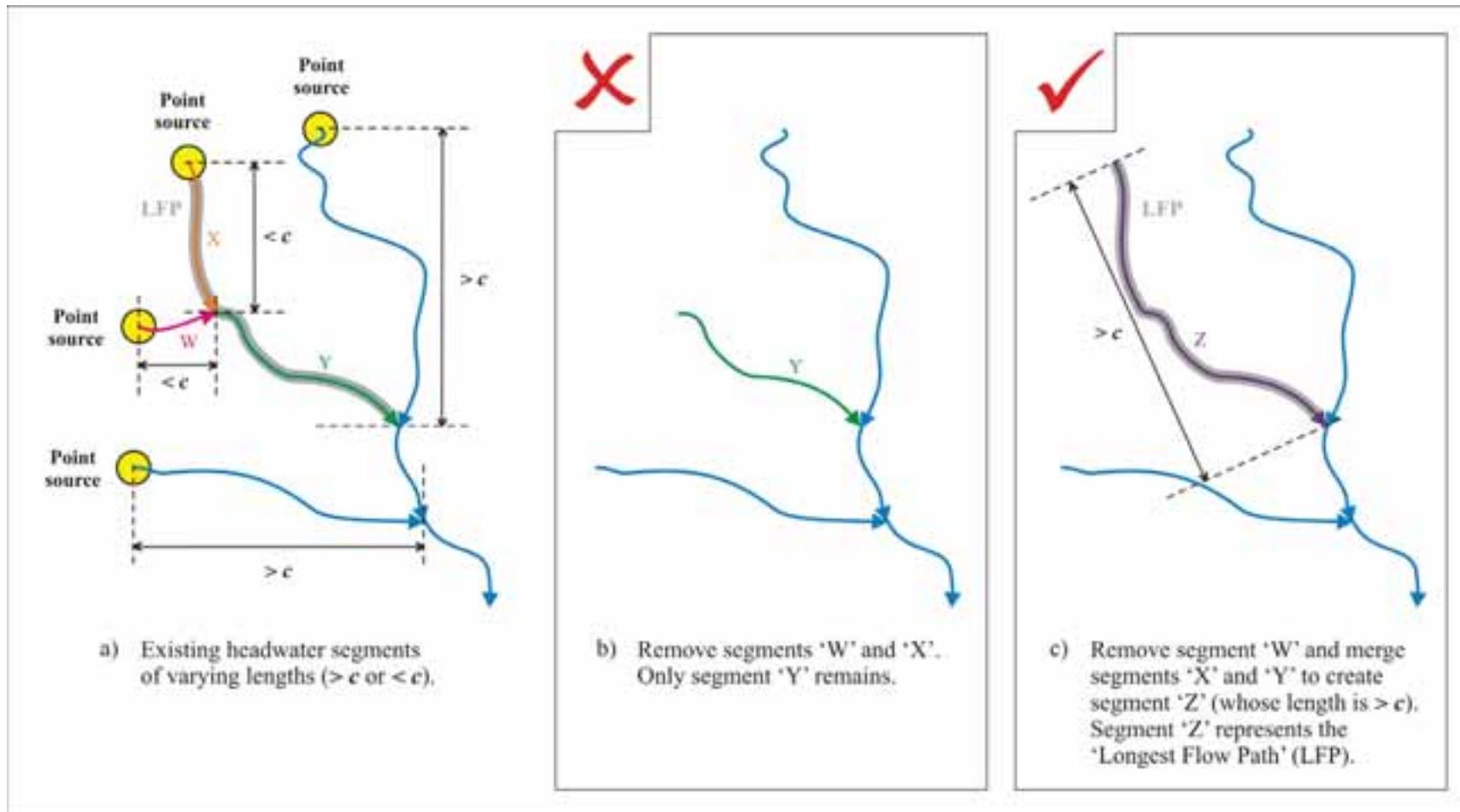
* Updated information...



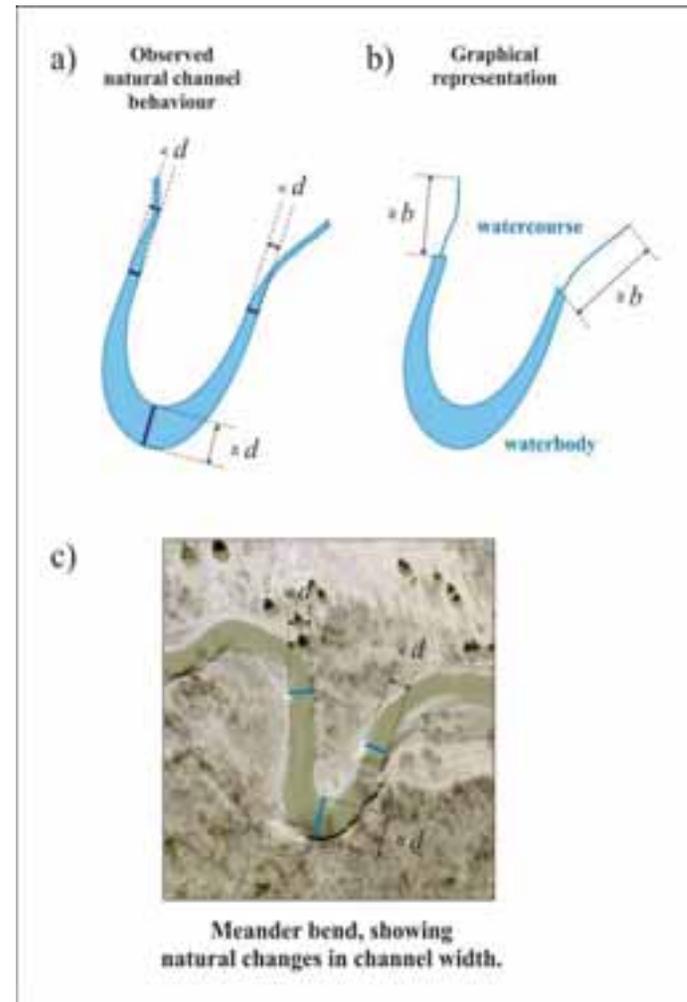
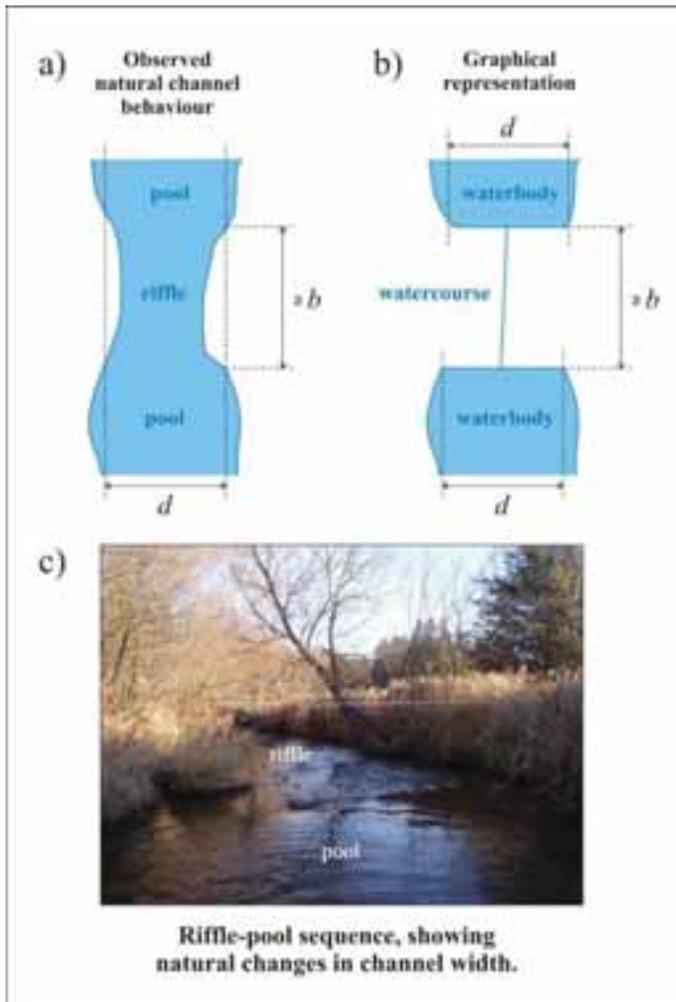
Feature specific capture rules



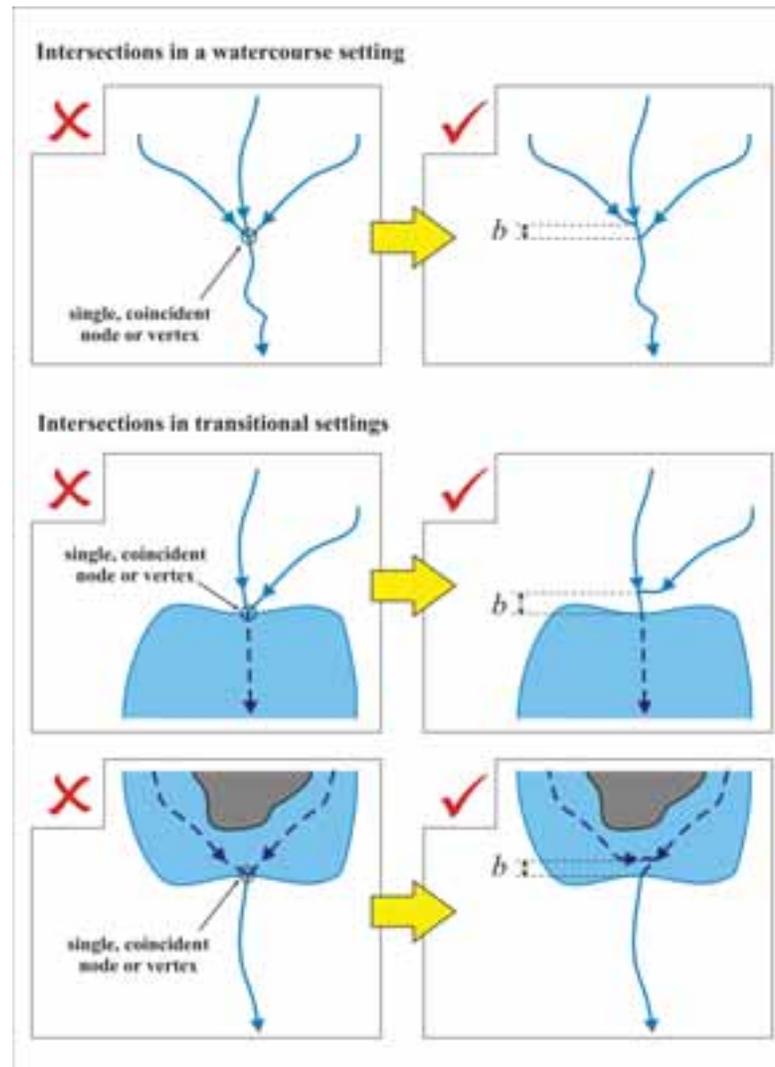
Feature specific capture rules continued



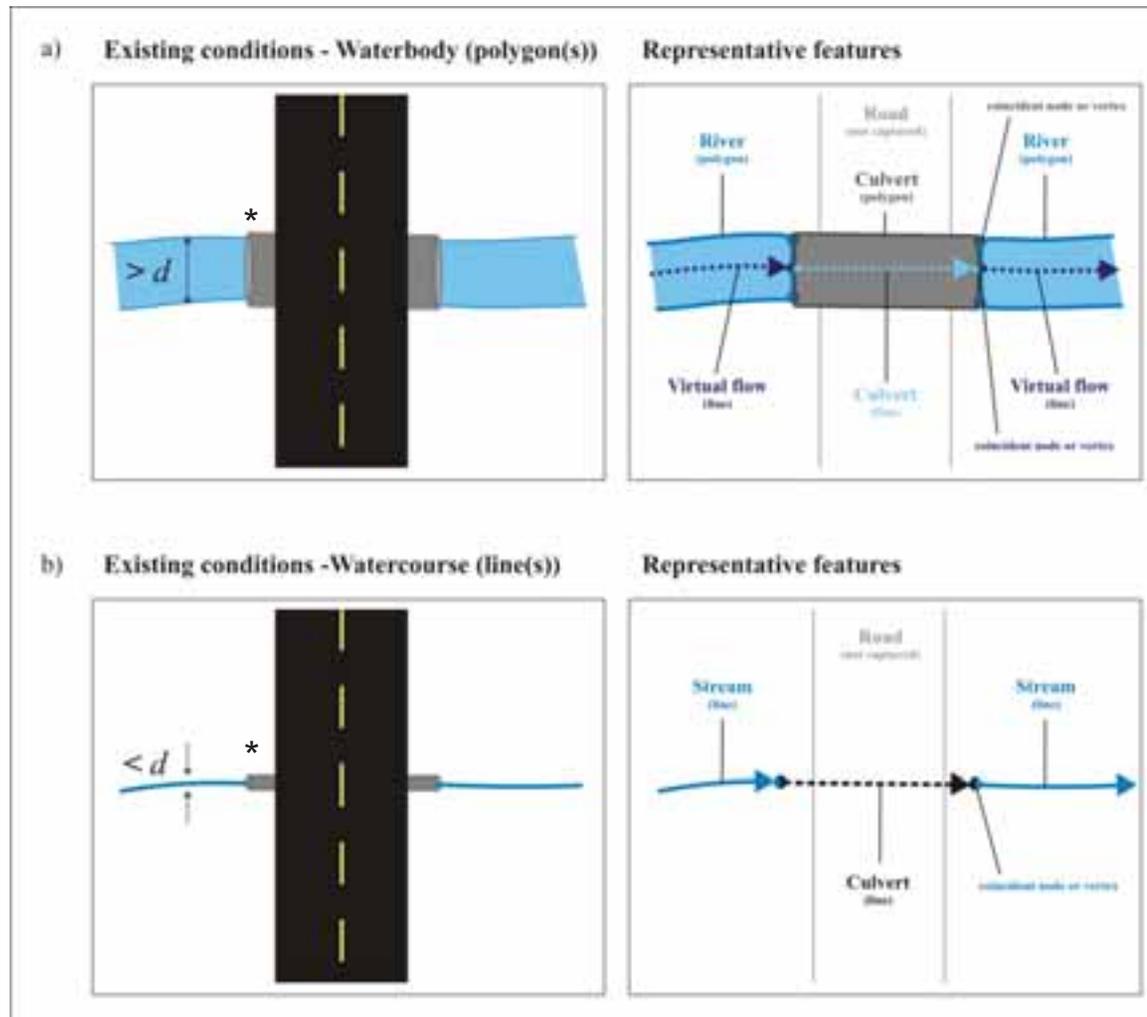
Feature specific capture rules continued



Feature specific capture rules continued



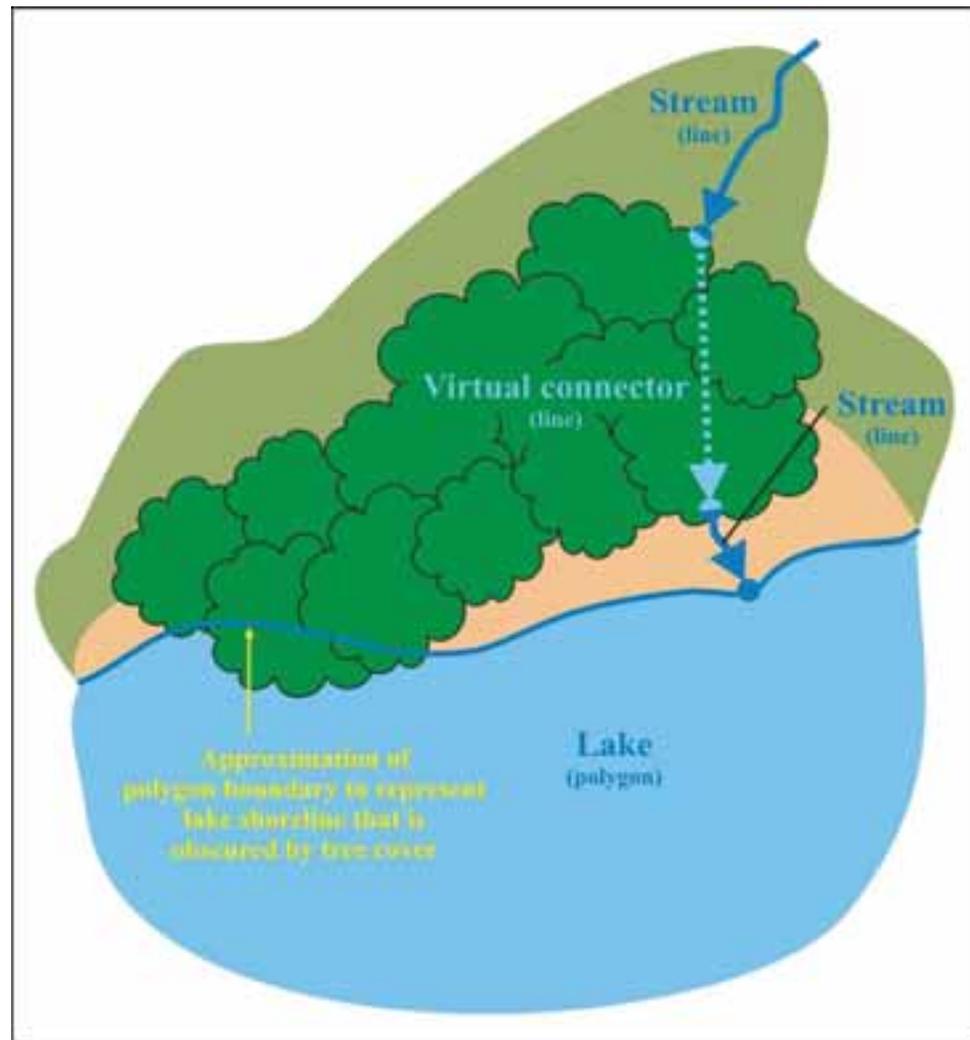
Feature specific capture rules continued



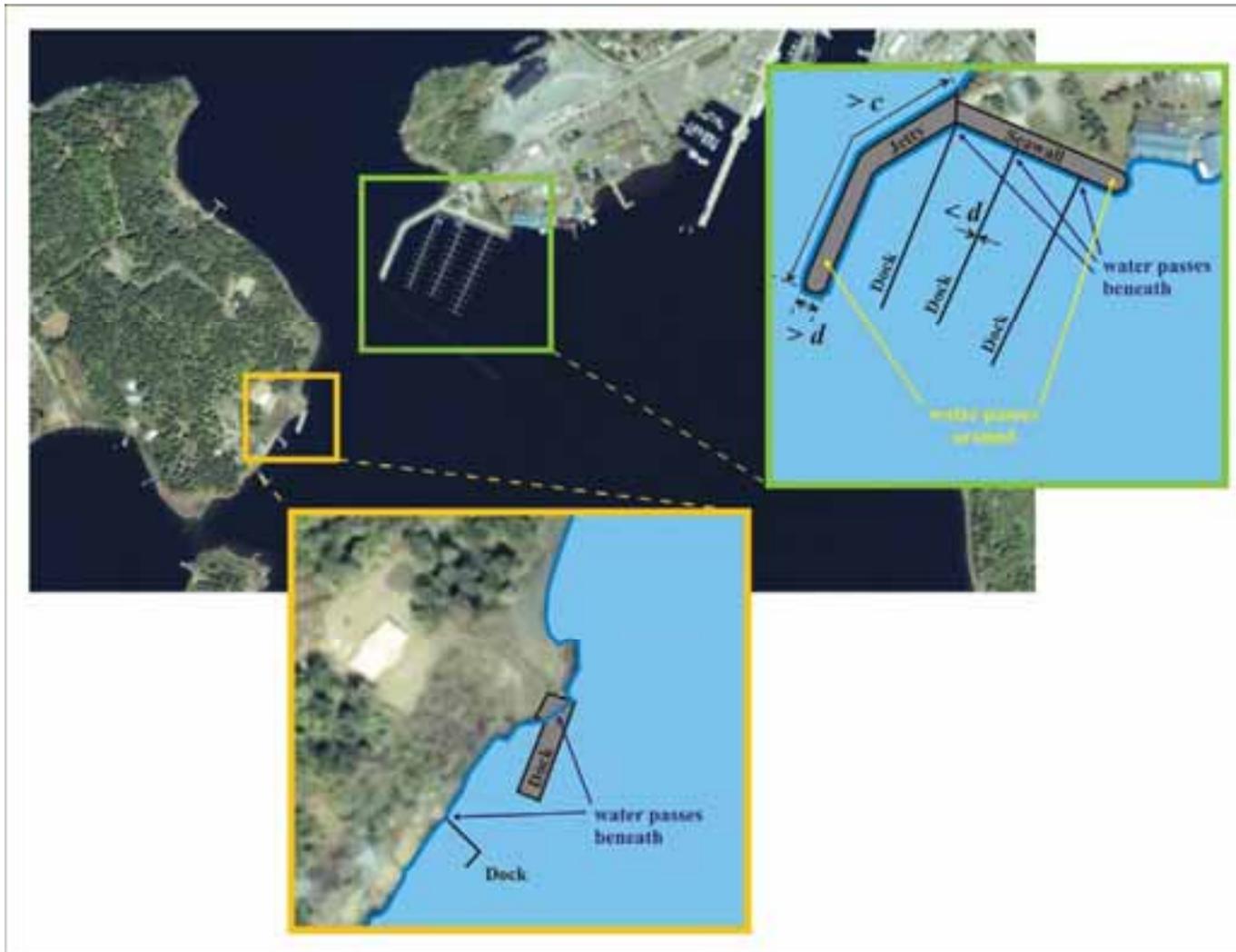
* Updated information...



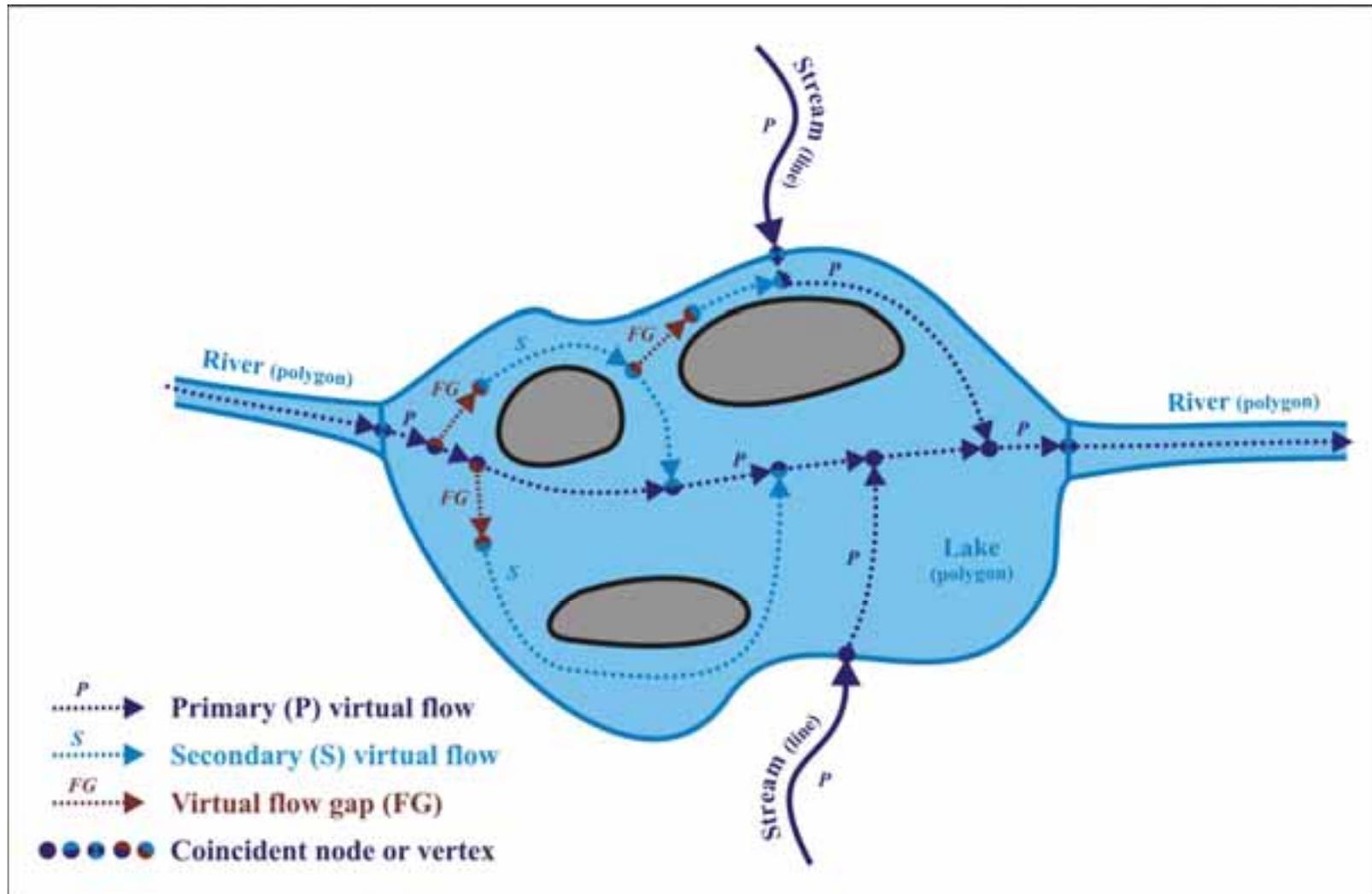
Feature specific capture rules continued



Feature specific capture rules continued



Feature specific capture rules continued



Suggested Graphical Representations of Additional Features, within:

	Land	Waterbody Settings						Transitional Settings			Watercourse Settings	
Polygon												
Point or Polyline												

Appendix D.

	Land	Waterbody Settings	Transitional Settings	Watercourse Settings
Crossing Structures				
Bridge/Overpass			✓	✓
Culvert			✓	✓
Forl		✓	✓	✓
Pipe/Inlet/Outlet/Outfall	✓	✓		✓
In-stream Obstacles or Irregularities				
Waterfall		✓	✓	✓
Rapids/Whirlpools		✓	✓	✓
Rock(s)		✓		✓
Island(s) (natural or man-made)		✓		✓
Exposed shipwreck		✓		✓
Fish ladder		✓	✓	✓
Sink/Spring	✓			✓
Flow Barriers				
Lock gate/Water gate			✓	
Dam			✓	✓
Beaver dam			✓	✓
Weir/Sluice gate			✓	✓
Sea lamprey barrier/Other fish barrier		✓	✓	✓
Embayment			✓	
Berm/Retaining wall			✓	
Pumping station			✓	✓
Coastal Features				
Reef			✓	✓
Wharf/Pier/Dock			✓	
Dry dock			✓	
Boat ramp/Slip			✓	
Artificial headland/ Jetty/ Quay			✓	
Curved, Stopped, or Rip-rap seawall/Headwall			✓	✓
Offshore breakwater/Breakwall			✓	



Suggested Graphical Representations of Additional Features, within:

	Land	Waterbody Settings					
Polygon							
Point or Polyline							

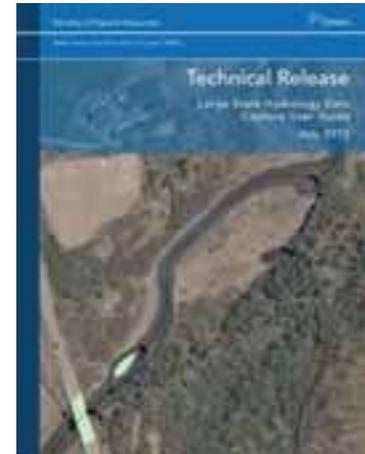
	Transitional Settings			Watercourse Settings	
Polygon				N/A	N/A
Point or Polyline					



After the project...

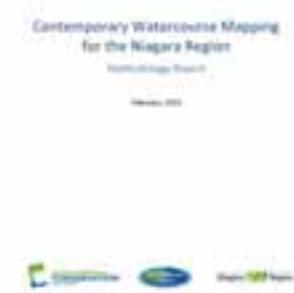
Ontario Ministry of Natural Resources – July 2012

- Created a ‘user guide’ that accompanies the specification document
 - Helps users translate the specifications into reality when reality doesn’t like to align with the specifications



Niagara Peninsula Conservation Authority and Niagara Region – February 2013

- Digital data for jurisdiction created over many years and adheres to various protocols
 - Looking for a complete inventory that addresses the needs of the land use planning process



Contact information

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