

# **Freshwater Atlas**

## **Named Stream Snaking Technical Documentation**

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# 1 SNAKING NAMED STREAMS

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## 1.1 Introduction

The Stream Name Matching processes matches TRIM toponyms to line segments; which resulted in a set of stream line segments being matched to a GNIS or TRIM name. These line segments however, were not connected or linked to corresponding segments downstream. The River Snaking process, snaked together named stream line segments and extended the named streams downstream.

## 1.2 Preconditions

The following preconditions are required:

- All flow edges with original names attached to matched stream segments
- Properly noded, coded, acyclic edge dataset
- GNIS Names, IDs and Descriptions
- GNIS Points (these points represent the approximate mouth of a named river)
- Links between GNIS Features based on the Description (e.g., if the description for River X states it flows into River Y, then there is a link between the GNIS ID for river X and the GNIS ID for river Y).

In addition, the following data is required for quality control checks:

- Named lakes (and an association to their skeleton lines)

## 1.3 Post Conditions

The following postconditions are met:

- connected named streams that have been extended downstream
- errors have been verified and if necessary correct by an QA person.

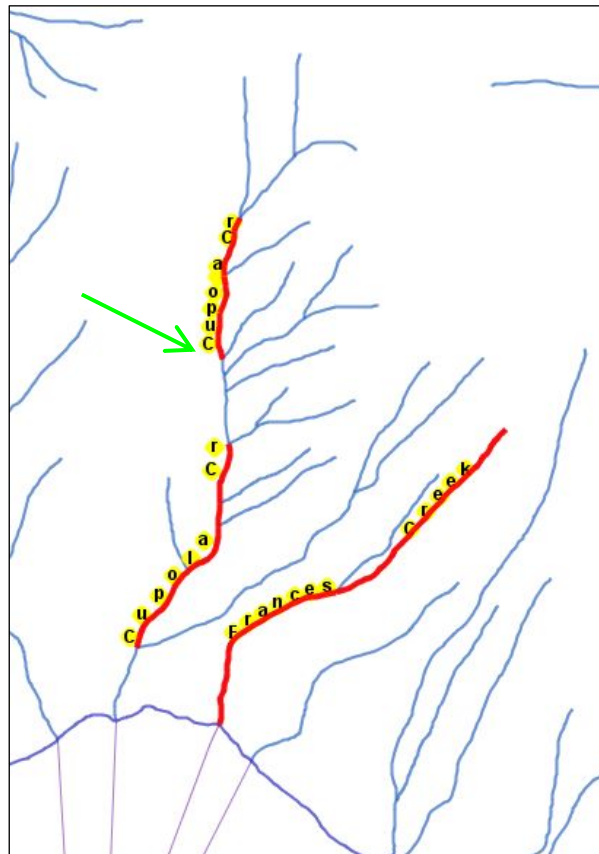
## 1.4 Snaking Process

### 1.4.1 Snaking Named Stream Edges

The Snaking Named Stream Edges finds disconnected stream segments and attempts to snake between them by walking down primary flows. If it is unable to join named stream segments, the program continues and an error will be created in the QA/QC checks.

The following figure shows how the snaking process fills in gaps that were created during the Name Matching Process. In this example, “Cupola Cr” was matched along the highlighted edges next to the Toponymy. The area that was not matched, as shown by the arrow, was filled by ‘walking’ down the primary flows and joining the two named segments together.

**Figure 1: Snaking Named Edges**



### 1.4.2 Extending Names Downstream

1. Named streams are pushed downstream until:
  - A connector (1450) edge is reached;
  - Another named stream is reached;
  - A sink (ocean) is reached; or
  - A non-inline inferred (1410) is reached.
2. Remaining 1410's are then removed from the mouth of named streams.
3. Named 1410's are converted from 1410's to 1425's.

The following figure shows the named streams edges for “Cupora Cr” and “Frances Creek” were pushed downstream (the **purple** edges) until they reached a 1450 (and in this case another named stream).

**Figure 2: Downstream Naming**

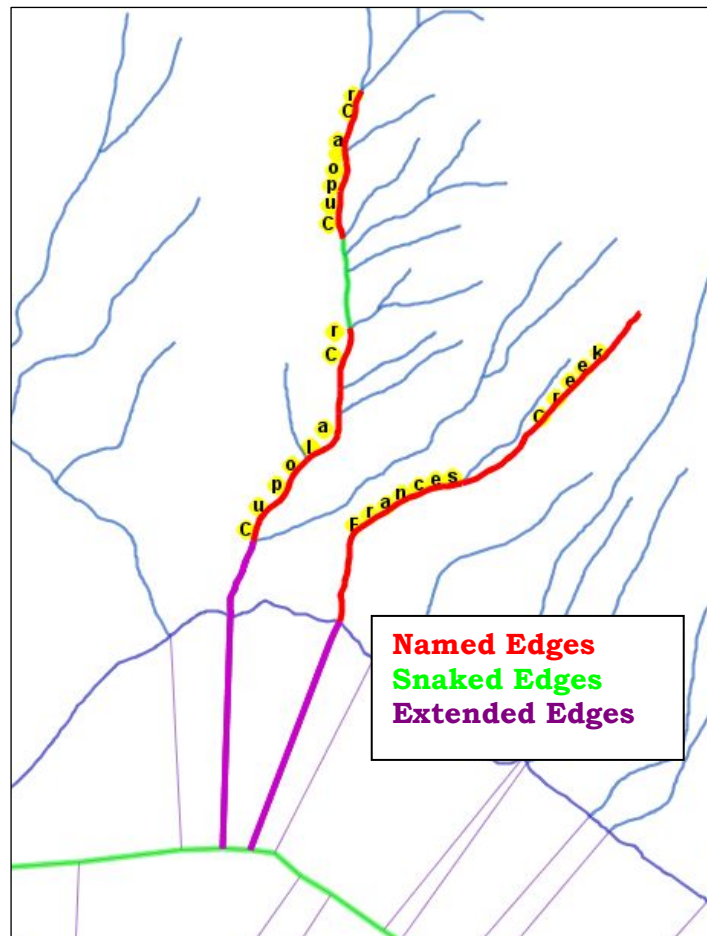
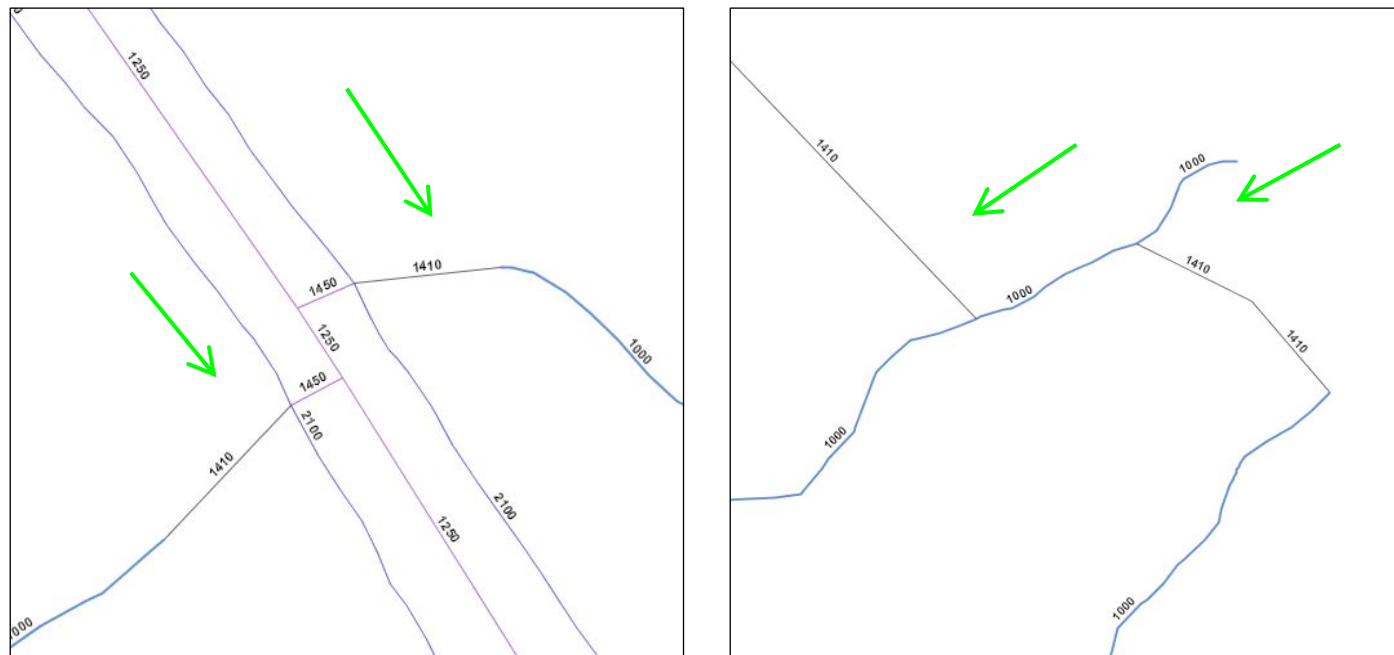


Figure 3 below shows the difference between in-line inferred edges (left) and non in-line inferred edges (right).

**Figure 3: Inferred Connectors**

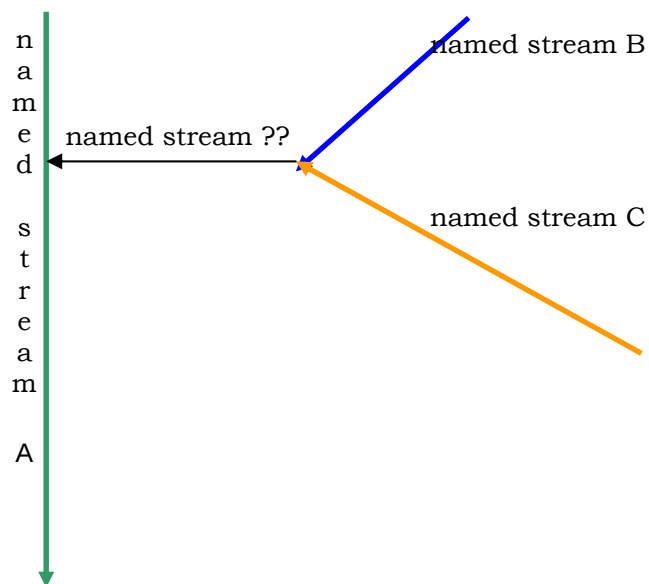


In cases where it is unclear which name to extend downstream, the GNIS points are used. If the GNIS points are the same, then the GNIS descriptions are used.

For example:

In the sketch shown below, when determining which name the black edge should be given, the GNIS points and descriptions are used. If the GNIS point for named stream C is closer to the black edge than named stream B, named stream C will be extended downstream. If the GNIS points are in the same location, the GNIS Descriptions are used. If the GNIS Description for named streams B was “flow into stream C” then named stream B would be extended downstream. In cases where neither case assists in naming a black edge, a random stream is extended downstream.

The majority of these cases only effect one or two edges near the mouth of the streams.



### 1.4.3 QA/QC Checks

The follow QA/QC checks are performed:

1. Each named stream is connected.
2. There are no connectors (1450) edges in the middle of named streams.  
Connector edges can only occur at the mouth of named streams.
3. There are no secondary flows in the named streams (there are a limited number of named secondary streams, however these are just flagged as errors and ignored).
4. Verifying the start of a named stream is legal (another named stream doesn't flow directly into the current named stream).
5. Names don't end in invalid locations (that the named stream doesn't flow directly into another named stream). Again, some of these are valid; however, the program flags them for review.

There are exceptions to each of these QA rules. The snaking and QA results are displayed to the user who can then modify the stream matching and/or ignore errors.