Fall and Winter Movement Patterns of Translocated Adult Sicklefin Redhorse (*Moxostoma* sp.) in the Oconaluftee River, North Carolina

Abstract

The southeastern United States contains the most diverse freshwater fauna in North America, yet many of these species are imperiled. The Sicklefin Redhorse is currently an undescribed species of the genus *Moxostoma*, endemic to the Hiawassee and Little Tennessee river basins of western North Carolina and northern Georgia. They are listed as a priority wildlife species of North Carolina with a state status of “significantly rare”, and are expected to gain federal protection under the Endangered Species Act within the next year. Like many potamodromous fishes, the Sicklefin Redhorse population is at risk of fragmentation due to stream impediments, habitat degradation, and restriction of its natural home range. The objective of this study was to determine the suitability of the Oconaluftee River, which is historically within Sicklefin Redhorse’s home range, for future reintroductions by tracking movement patterns of translocated individuals. Ten native Sicklefin Redhorse were collected from the Tuckasegee River in Swain County, NC, surgically implanted with radio transmitters, and translocated into the Oconaluftee River. Fish were tracked individually using radio telemetry for six months. Movement patterns for newly
translocated fish, as well as seasonal patterns for female Sicklefin Redhorse, were comparable to those found within their current range. Although some fish moved extensively, the sedentary patterns observed in females is indicative that the habitat provided in the Oconaluftee River may be suitable for the Sicklefin Redhorse. Continued observation throughout the spawning season will help in fully determining suitability of the Oconaluftee river for future management and restoration of this imperiled species to its native home range.

**Keywords**

Chose three words that best describe your paper. Please list one space below the abstract, size 10, bolded.

**Keywords:** Patterns, *Adult Sicklefin Redhorse, North Carolina*

**Body of Paper**

Headings should be size 12, bold. Body of section one is single spaced, full justified Times Roman size 10.

1. **Body of Paper**

Your paper must be a minimum of 4 pages to a maximum of 10 pages. (No exceptions). Paper is single-spaced, full justified, no indents on first paragraph in each section, use 8-1/2 x 11” (US letter paper). Times New Roman in font size 10 for text. All margins 1”. Maximum page length from title information to references is 10 pages and no page breaks.

In most cases do not use personal pronouns. Personal pronouns are not accepted in your abstract. Even in those disciplines where personal pronouns have become accepted use with care. Overuse is not acceptable.

The first sentence in any section is NOT indented. Starting with the second paragraph in the same section indent 3 spaces, NOT five spaces. DO NOT TAB.

2. **Editorial Standards and Introduction**

Published papers will reflect genuine undergraduate student research. Inferences, general application of results and investigator's observations must be supported by data and references. Acceptance or rejection of the authors’ hypothesis must be fully supported and not biased opinion.

3. **Main Headings**

Main headings are in font size 12, bold, capitalize each word. Skip one line between heading and paragraph using no indent to the first paragraph. Suggestions for headings: Introduction, Methodology, Data, Conclusion, Acknowledgements, and References, Endnotes.

3.1. **secondary headings**

Secondary headings are in font size 12, and lower case, not bolded.

3.1.1. **tertiary headings**

Tertiary headings are in font size 12, italic, and lower case, not bolded and italicized.

3.2. **tables, equations, figures, graphs, or pictures**

Insert your tables, equations, figures, graphs, or pictures into your document where indicated in the text. We do not accept appendices. Maximum page length from title information to references is 10 pages.
Equations should be referred in the text as equation (1), be indented six spaces, and numbered in parentheses. Equation numbers are right justified. There are two spaces between text and equations.

\[
\text{Anode: } \text{H}_2 \rightarrow 2\text{H}^+ + 2\text{e}^- \quad (1)
\]

\[
\text{Cathode: } \text{O}_2 + 4\text{H}^+ + 4\text{e}^- \rightarrow \text{H}_2\text{O} \quad (2)
\]

Numbers and captions should appear above each table in lower case, e.g.

Table 1. Physical data and home range size for Sicklefin Redhorse tagged on August 26th, 2014 in the Oconaluftee River, NC.

<table>
<thead>
<tr>
<th>Fish #</th>
<th>Total Length (mm)</th>
<th>Weight (kg)</th>
<th>Sex</th>
<th>Fall Range (m)</th>
<th>Winter Range (m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>14</td>
<td>591</td>
<td>1.60</td>
<td>Female</td>
<td>&gt;5664</td>
<td>unknown</td>
</tr>
<tr>
<td>15</td>
<td>538</td>
<td>1.30</td>
<td>Unknown</td>
<td>384</td>
<td>0</td>
</tr>
<tr>
<td>18</td>
<td>600</td>
<td>1.65</td>
<td>Female</td>
<td>310</td>
<td>0</td>
</tr>
<tr>
<td>19</td>
<td>510</td>
<td>1.25</td>
<td>Female</td>
<td>105</td>
<td>0</td>
</tr>
<tr>
<td>20</td>
<td>605</td>
<td>2.00</td>
<td>Female</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Figures and their captions should be centered as illustrated in the example (Figure 1) below. Captions should also appear as illustrated below with all but the first word in the caption in lower case. Captions should be brief and descriptive. Comments on the figure should be left justified one line below caption. Paper text would then begin one line below comment. Landscape orientation is preferred. However, for some photographs landscape is not appropriate.

Figure 1. Movement patterns for tagged fish #19 and #15 from release site #1. River meters were calculated with the release.

Include a few sentences explaining the figure.
4. Acknowledgements

The author(s) wish to express their appreciation to ....

5. Cite References

Footnotes are not acceptable. To cite a reference in your paper use a superscript number1. We do not accept roman numerals, or parenthetical notations (Smith, Roberts 2004).

5.1. references

References are required. The preferred style for citing references is the Note (N) format found in the Chicago Manual of Style, 15th ed. Use endnotes as opposed to footnotes, following the examples below. You are encouraged to consult the Chicago Manual of Style for additional examples not provided here.

You may opt to use another style better suited to your discipline (American Chemical Society, American Institute of Physics, etc.) provided that references are numbered and appear and the end of the paper.

Use superscript numbers in the body of your paper to note references – like this1. Do not use parenthetical notation like this: (Doniger 1999, 23).

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