

## IPRenewal NPEmails

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**From:** Nancy Decker <ndecker@asaac.com>  
**Sent:** Thursday, April 21, 2016 10:11 AM  
**To:** Wentzel, Michael  
**Cc:** Dara Gray  
**Subject:** [External\_Sender] Email 5 for 2013 YCR  
**Attachments:** 2013-Chapter 4.pdf

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**From:** Nancy Decker

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**Recipients:**

"Dara Gray" <dgray@entergy.com>  
Tracking Status: None  
"Wentzel, Michael" <Michael.Wentzel@nrc.gov>  
Tracking Status: None

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## CHAPTER 4

# SPATIOTEMPORAL DISTRIBUTION OF SELECTED SPECIES OF HUDSON RIVER ESTUARY FISHES

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This chapter presents graphs of the spatiotemporal distribution within the Hudson River for 16 selected species as well as graphs of the temporal, geographical, and annual abundance indices for these species. Length data for young-of-year fish of several species are plotted. Supporting tables for these graphs are provided in Appendices C (Species Composition), D (Density and Standing Crop Estimates), E (Temporal and Geographical Distribution Indices), F (Annual Abundance Indices), and G (Length Frequency Distribution).

### 4.1 SPECIES COLLECTED

Overall species composition for each year from 1974 to 2013 and species composition by survey for 2013 are tabulated.

| Links to Tables                                | Table               | Supporting Appendix Tables                                      |
|------------------------------------------------|---------------------|-----------------------------------------------------------------|
| Fish species collected for 1974 to 2013        | <a href="#">4-1</a> | --                                                              |
| Species composition of fish by survey for 2013 | <a href="#">4-2</a> | <a href="#">C-1</a> , <a href="#">C-2</a> , <a href="#">C-3</a> |

### 4.2 STRIPED BASS

| Links to Graphs                                                                           | Graph               | Supporting Appendix Tables   |
|-------------------------------------------------------------------------------------------|---------------------|------------------------------|
| Spatiotemporal distribution of eggs, yolk-sac, and post yolk-sac larval fish for 2013 LRS | <a href="#">4-1</a> | <a href="#">D-1 to D-6</a>   |
| Spatiotemporal distribution of young-of-year fish for 2013 LRS/FJS/BSS                    | <a href="#">4-2</a> | <a href="#">D-7 to D-12</a>  |
| Spatiotemporal distribution of yearling fish for 2013 LRS/FJS/BSS                         | <a href="#">4-3</a> | <a href="#">D-13 to D-18</a> |
| Spatiotemporal distribution of older-than-yearling fish for 2013 LRS/FJS/BSS              | <a href="#">4-4</a> | <a href="#">D-19 to D-24</a> |
| Temporal distribution indices for LRS for 1974 to 2013                                    | <a href="#">4-5</a> | <a href="#">E-1</a>          |
| Geographical distribution indices for LRS for 1974 to 2013                                | <a href="#">4-6</a> | <a href="#">E-2</a>          |
| Geographical distribution indices for BSS for 1974 to 2013                                | <a href="#">4-7</a> | <a href="#">E-3</a>          |
| Annual abundance indices                                                                  | <a href="#">4-8</a> | <a href="#">F-1</a>          |
| Weekly length statistics for young-of-year fish for 2013 LRS/FJS/BSS                      | <a href="#">4-9</a> | <a href="#">G-1 to G-3</a>   |

### 4.3 WHITE PERCH

| Links to Graphs                                                                           | Graph                | Supporting Appendix Tables   |
|-------------------------------------------------------------------------------------------|----------------------|------------------------------|
| Spatiotemporal distribution of eggs, yolk-sac, and post yolk-sac larval fish for 2013 LRS | <a href="#">4-10</a> | <a href="#">D-25 to D-30</a> |
| Spatiotemporal distribution of young-of-year fish for 2013 LRS/FJS/BSS                    | <a href="#">4-11</a> | <a href="#">D-31 to D-36</a> |
| Spatiotemporal distribution of yearling fish for 2013 LRS/FJS/BSS                         | <a href="#">4-12</a> | <a href="#">D-37 to D-42</a> |
| Spatiotemporal distribution of older-than-yearling fish for 2013 LRS/FJS/BSS              | <a href="#">4-13</a> | <a href="#">D-43 to D-48</a> |
| Temporal distribution indices for LRS for 1974 to 2013                                    | <a href="#">4-14</a> | <a href="#">E-4</a>          |
| Geographical distribution indices for LRS for 1974 to 2013                                | <a href="#">4-15</a> | <a href="#">E-5</a>          |
| Geographical distribution indices for BSS for 1974 to 2013                                | <a href="#">4-16</a> | <a href="#">E-6</a>          |
| Annual abundance indices                                                                  | <a href="#">4-17</a> | <a href="#">F-2</a>          |
| Weekly length statistics for young-of-year fish for 2013 LRS/FJS/BSS                      | <a href="#">4-18</a> | <a href="#">G-4 to G-6</a>   |

### 4.4 ATLANTIC TOMCOD

| Links to Graphs                                                                           | Graph                | Supporting Appendix Tables   |
|-------------------------------------------------------------------------------------------|----------------------|------------------------------|
| Spatiotemporal distribution of eggs, yolk-sac, and post yolk-sac larval fish for 2013 LRS | <a href="#">4-19</a> | <a href="#">D-49 to D-54</a> |
| Spatiotemporal distribution of young-of-year fish for 2013 LRS/FJS/BSS                    | <a href="#">4-20</a> | <a href="#">D-55 to D-60</a> |
| Spatiotemporal distribution of yearling and older fish for 2013 LRS/FJS/BSS               | <a href="#">4-21</a> | <a href="#">D-61 to D-66</a> |
| Temporal distribution indices for LRS for 1974 to 2013                                    | <a href="#">4-22</a> | <a href="#">E-7</a>          |
| Geographical distribution indices for LRS for 1974 to 2013                                | <a href="#">4-23</a> | <a href="#">E-8</a>          |
| Geographical distribution indices for FJS for 1979 to 2013                                | <a href="#">4-24</a> | <a href="#">E-9</a>          |
| Annual abundance indices                                                                  | <a href="#">4-25</a> | <a href="#">F-3</a>          |
| Weekly length statistics for young-of-year fish for 2013 LRS/FJS/BSS                      | <a href="#">4-26</a> | <a href="#">G-7 to G-9</a>   |

#### 4.5 BAY ANCHOVY

| Links to Graphs                                                                           | Graph                | Supporting Appendix Tables   |
|-------------------------------------------------------------------------------------------|----------------------|------------------------------|
| Spatiotemporal distribution of eggs, yolk-sac, and post yolk-sac larval fish for 2013 LRS | <a href="#">4-27</a> | <a href="#">D-67 to D-72</a> |
| Spatiotemporal distribution of young-of-year fish for 2013 LRS/FJS/BSS                    | <a href="#">4-28</a> | <a href="#">D-73 to D-78</a> |
| Spatiotemporal distribution of yearling and older fish for 2013 LRS/FJS/BSS               | <a href="#">4-29</a> | <a href="#">D-79 to D-84</a> |
| Temporal distribution indices for LRS for 1988 to 2013                                    | <a href="#">4-30</a> | <a href="#">E-10</a>         |
| Geographical distribution indices for LRS for 1988 to 2013                                | <a href="#">4-31</a> | <a href="#">E-11</a>         |
| Geographical distribution indices for BSS for 1974 to 2013                                | <a href="#">4-32</a> | <a href="#">E-12</a>         |
| Annual abundance indices                                                                  | <a href="#">4-33</a> | <a href="#">F-4</a>          |
| Weekly length statistics for young-of-year fish for 2013 LRS/FJS/BSS                      | <a href="#">4-34</a> | <a href="#">G-10 to G-12</a> |

#### 4.6 AMERICAN SHAD

| Links to Graphs                                                                           | Graph                | Supporting Appendix Tables    |
|-------------------------------------------------------------------------------------------|----------------------|-------------------------------|
| Spatiotemporal distribution of eggs, yolk-sac, and post yolk-sac larval fish for 2013 LRS | <a href="#">4-35</a> | <a href="#">D-85 to D-90</a>  |
| Spatiotemporal distribution of young-of-year fish for 2013 LRS/FJS/BSS                    | <a href="#">4-36</a> | <a href="#">D-91 to D-96</a>  |
| Spatiotemporal distribution of yearling and older fish for 2013 LRS/FJS/BSS               | <a href="#">4-37</a> | <a href="#">D-97 to D-102</a> |
| Temporal distribution indices for LRS for 1974 to 2013                                    | <a href="#">4-38</a> | <a href="#">E-13</a>          |
| Geographical distribution indices for LRS for 1974 to 2013                                | <a href="#">4-39</a> | <a href="#">E-14</a>          |
| Geographical distribution indices for BSS for 1974 to 2013                                | <a href="#">4-40</a> | <a href="#">E-15</a>          |
| Annual abundance indices                                                                  | <a href="#">4-41</a> | <a href="#">F-5</a>           |
| Weekly length statistics for young-of-year fish for 2013 LRS/FJS/BSS                      | <a href="#">4-42</a> | <a href="#">G-13 to G-15</a>  |

#### 4.7 RIVER HERRINGS (*Alosa* spp.)

| Links to Graphs                                                                           | Graph                | Supporting Appendix Tables     |
|-------------------------------------------------------------------------------------------|----------------------|--------------------------------|
| Spatiotemporal distribution of eggs, yolk-sac, and post yolk-sac larval fish for 2013 LRS | <a href="#">4-43</a> | <a href="#">D-103 to D-108</a> |
| Spatiotemporal distribution of young-of-year fish for 2013 LRS/FJS/BSS                    | <a href="#">4-44</a> | <a href="#">D-109 to D-114</a> |
| Temporal distribution indices for LRS for 1974 to 2013                                    | <a href="#">4-45</a> | <a href="#">E-16</a>           |
| Geographical distribution indices for LRS for 1974 to 2013                                | <a href="#">4-46</a> | <a href="#">E-17</a>           |
| Geographical distribution indices for BSS for 1974 to 2013                                | <a href="#">4-47</a> | <a href="#">E-18</a>           |

#### 4.8 ALEWIFE

| Links to Graphs                                                                             | Graph                | Supporting Appendix Tables     |
|---------------------------------------------------------------------------------------------|----------------------|--------------------------------|
| <a href="#">Spatiotemporal distribution of young-of-year fish for 2013 LRS/FJS/BSS</a>      | <a href="#">4-48</a> | <a href="#">D-115 to D-120</a> |
| <a href="#">Spatiotemporal distribution of yearling and older fish for 2013 LRS/FJS/BSS</a> | <a href="#">4-49</a> | <a href="#">D-121 to D-126</a> |
| <a href="#">Geographical distribution indices for BSS for 1974 to 2013</a>                  | <a href="#">4-50</a> | <a href="#">E-19</a>           |
| <a href="#">Annual abundance indices</a>                                                    | <a href="#">4-51</a> | <a href="#">F-6</a>            |
| <a href="#">Weekly length statistics for young-of-year fish for 2013 FJS/BSS</a>            | <a href="#">4-52</a> | <a href="#">G-16 to G-17</a>   |

#### 4.9 BLUEBACK HERRING

| Links to Graphs                                                                             | Graph                | Supporting Appendix Tables     |
|---------------------------------------------------------------------------------------------|----------------------|--------------------------------|
| <a href="#">Spatiotemporal distribution of young-of-year fish for 2013 LRS/FJS/BSS</a>      | <a href="#">4-53</a> | <a href="#">D-127 to D-132</a> |
| <a href="#">Spatiotemporal distribution of yearling and older fish for 2013 LRS/FJS/BSS</a> | <a href="#">4-54</a> | <a href="#">D-133 to D-138</a> |
| <a href="#">Geographical distribution indices for BSS for 1974 to 2013</a>                  | <a href="#">4-55</a> | <a href="#">E-20</a>           |
| <a href="#">Annual abundance indices</a>                                                    | <a href="#">4-56</a> | <a href="#">F-7</a>            |
| <a href="#">Weekly length statistics for young-of-year fish for 2013 FJS/BSS</a>            | <a href="#">4-57</a> | <a href="#">G-18 to G-19</a>   |

#### 4.10 GIZZARD SHAD

| Links to Graphs                                                                             | Graph                | Supporting Appendix Tables     |
|---------------------------------------------------------------------------------------------|----------------------|--------------------------------|
| <a href="#">Spatiotemporal distribution of young-of-year fish for 2013 LRS/FJS/BSS</a>      | <a href="#">4-58</a> | <a href="#">D-139 to D-144</a> |
| <a href="#">Spatiotemporal distribution of yearling and older fish for 2013 LRS/FJS/BSS</a> | <a href="#">4-59</a> | <a href="#">D-145 to D-150</a> |
| <a href="#">Geographical distribution indices for BSS for 1974 to 2013</a>                  | <a href="#">4-60</a> | <a href="#">E-21</a>           |

#### 4.11 RAINBOW SMELT

| Links to Graphs                                                                                                   | Graph                | Supporting Appendix Tables     |
|-------------------------------------------------------------------------------------------------------------------|----------------------|--------------------------------|
| <a href="#">Spatiotemporal distribution of eggs, yolk-sac, and post yolk-sac larval fish for 2013 LRS/FJS/BSS</a> | <a href="#">4-61</a> | <a href="#">D-151 to D-152</a> |
| <a href="#">Spatiotemporal distribution of yearling and older fish for 2013 LRS/FJS/BSS</a>                       | --                   | <a href="#">D-153 to D-158</a> |
| <a href="#">Temporal distribution indices for LRS for 1974 to 2013</a>                                            | <a href="#">4-62</a> | <a href="#">E-22</a>           |
| <a href="#">Geographical distribution indices for LRS for 1974 to 2013</a>                                        | <a href="#">4-63</a> | <a href="#">E-23</a>           |
| <a href="#">Geographical distribution indices for FJS for 1979 to 2013</a>                                        | <a href="#">4-64</a> | <a href="#">E-24</a>           |
| <a href="#">Annual abundance indices</a>                                                                          | <a href="#">4-65</a> | <a href="#">F-8</a>            |

#### 4.12 HOGCHOKER

| Links to Graphs                                                                           | Graph                | Supporting Appendix Tables     |
|-------------------------------------------------------------------------------------------|----------------------|--------------------------------|
| Spatiotemporal distribution of eggs, yolk-sac, and post yolk-sac larval fish for 2013 LRS | <a href="#">4-66</a> | <a href="#">D-159 to D-164</a> |
| Spatiotemporal distribution of young-of-year fish for 2013 LRS/FJS/BSS                    | <a href="#">4-67</a> | <a href="#">D-165 to D-170</a> |
| Spatiotemporal distribution of yearling and older fish for 2013 LRS/FJS/BSS               | <a href="#">4-68</a> | <a href="#">D-171 to D-176</a> |
| Geographical distribution indices for FJS for 1979 to 2013                                | <a href="#">4-69</a> | <a href="#">E-25</a>           |
| Annual abundance indices                                                                  | <a href="#">4-70</a> | <a href="#">F-9</a>            |

#### 4.13 SPOTTAIL SHINER

| Links to Graphs                                                             | Graph                | Supporting Appendix Tables     |
|-----------------------------------------------------------------------------|----------------------|--------------------------------|
| Spatiotemporal distribution of young-of-year fish for 2013 LRS/FJS/BSS      | <a href="#">4-71</a> | <a href="#">D-177 to D-182</a> |
| Spatiotemporal distribution of yearling and older fish for 2013 LRS/FJS/BSS | <a href="#">4-72</a> | <a href="#">D-183 to D-188</a> |
| Geographical distribution indices for BSS for 1974 to 2013                  | <a href="#">4-73</a> | <a href="#">E-26</a>           |
| Annual abundance indices                                                    | <a href="#">4-74</a> | <a href="#">F-10</a>           |
| Weekly length statistics for young-of-year fish for 2013 FJS/BSS            | <a href="#">4-75</a> | <a href="#">G-20 to G-21</a>   |

#### 4.14 ATLANTIC STURGEON

| Links to Table/Graph                                                                                       | Table/Graph          | Supporting Appendix Tables     |
|------------------------------------------------------------------------------------------------------------|----------------------|--------------------------------|
| Collections of fish for 2013 LRS/FJS/BSS                                                                   | <a href="#">4-3</a>  | --                             |
| Spatiotemporal distribution of yolk-sac, post yolk-sac larval, and young-of-year fish for 2013 LRS/FJS/BSS | <a href="#">4-76</a> | <a href="#">D-189 to D-194</a> |
| Spatiotemporal distribution of yearling and older fish for 2013 LRS/FJS/BSS                                | <a href="#">4-77</a> | <a href="#">D-195 to D-200</a> |

#### 4.15 SHORTNOSE STURGEON

| Links to Table/Graph                                                                                       | Table/Graph          | Supporting Appendix Tables     |
|------------------------------------------------------------------------------------------------------------|----------------------|--------------------------------|
| Collections of fish for 2013 LRS/FJS/BSS                                                                   | <a href="#">4-4</a>  | --                             |
| Collections of unidentified sturgeon for 2013 LRS/FJS/BSS                                                  | <a href="#">4-5</a>  | --                             |
| Spatiotemporal distribution of yolk-sac, post yolk-sac larval, and young-of-year fish for 2013 LRS/FJS/BSS | --                   | <a href="#">D-201 to D-206</a> |
| Spatiotemporal distribution of yearling and older fish for 2013 LRS/FJS/BSS                                | <a href="#">4-78</a> | <a href="#">D-207 to D-212</a> |

#### 4.16 WHITE CATFISH

| Links to Graphs                                                                             | Graph                | Supporting Appendix Tables     |
|---------------------------------------------------------------------------------------------|----------------------|--------------------------------|
| <a href="#">Spatiotemporal distribution of young-of-year fish for 2013 LRS/FJS/BSS</a>      | <a href="#">4-79</a> | <a href="#">D-213 to D-218</a> |
| <a href="#">Spatiotemporal distribution of yearling and older fish for 2013 LRS/FJS/BSS</a> | <a href="#">4-80</a> | <a href="#">D-219 to D-224</a> |
| <a href="#">Geographical distribution indices for FJS for 1979 to 2013</a>                  | <a href="#">4-81</a> | <a href="#">E-27</a>           |
| <a href="#">Annual abundance indices</a>                                                    | <a href="#">4-82</a> | <a href="#">F-11</a>           |
| <a href="#">Weekly length statistics for young-of-year fish for 2013 FJS/BSS</a>            | <a href="#">4-83</a> | <a href="#">G-22 to G-23</a>   |

#### 4.17 WEAKEFISH

| Links to Graphs                                                                             | Graph                | Supporting Appendix Tables     |
|---------------------------------------------------------------------------------------------|----------------------|--------------------------------|
| <a href="#">Spatiotemporal distribution of young-of-year fish for 2013 LRS/FJS/BSS</a>      | <a href="#">4-84</a> | <a href="#">D-225 to D-230</a> |
| <a href="#">Spatiotemporal distribution of yearling and older fish for 2013 LRS/FJS/BSS</a> | <a href="#">4-85</a> | <a href="#">D-231 to D-236</a> |
| <a href="#">Geographical distribution indices for FJS for 1979 to 2013</a>                  | <a href="#">4-86</a> | <a href="#">E-28</a>           |
| <a href="#">Annual abundance indices</a>                                                    | <a href="#">4-87</a> | <a href="#">F-12</a>           |
| <a href="#">Weekly length statistics for young-of-year fish for 2013 FJS/BSS</a>            | <a href="#">4-88</a> | <a href="#">G-24 to G-25</a>   |

#### 4.18 BLUEFISH

| Links to Graphs                                                                        | Graph                | Supporting Appendix Tables     |
|----------------------------------------------------------------------------------------|----------------------|--------------------------------|
| <a href="#">Spatiotemporal distribution of young-of-year fish for 2013 LRS/FJS/BSS</a> | <a href="#">4-89</a> | <a href="#">D-237 to D-242</a> |
| <a href="#">Geographical distribution indices for BSS for 1974 to 2013</a>             | <a href="#">4-90</a> | <a href="#">E-29</a>           |
| <a href="#">Annual abundance indices</a>                                               | <a href="#">4-91</a> | <a href="#">F-13</a>           |

[Link to References](#)



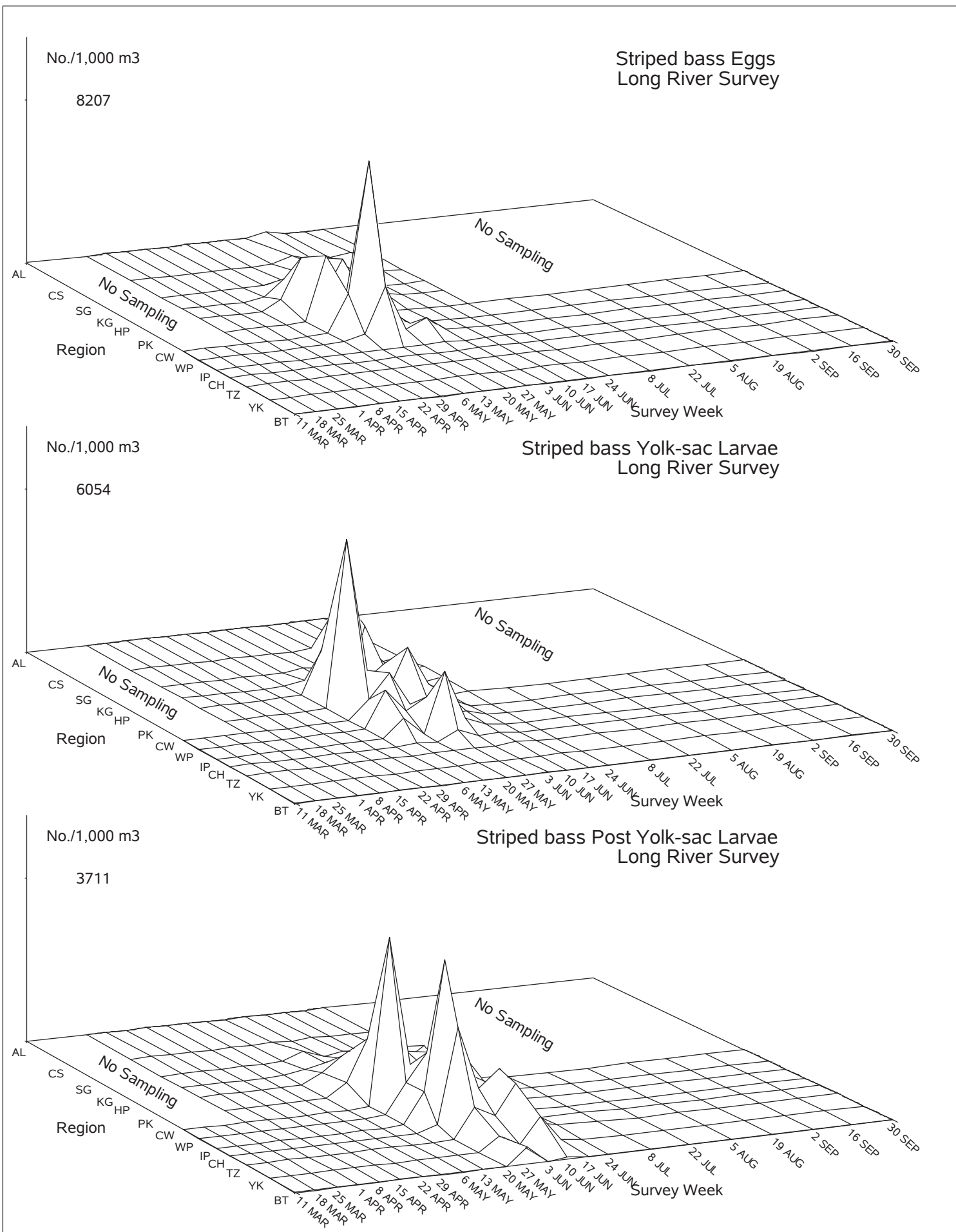


Figure 4-1. Spatiotemporal distribution of eggs, yolk-sac, and post yolk-sac larval striped bass in the Hudson River estuary based on the 2013 Long River Survey.

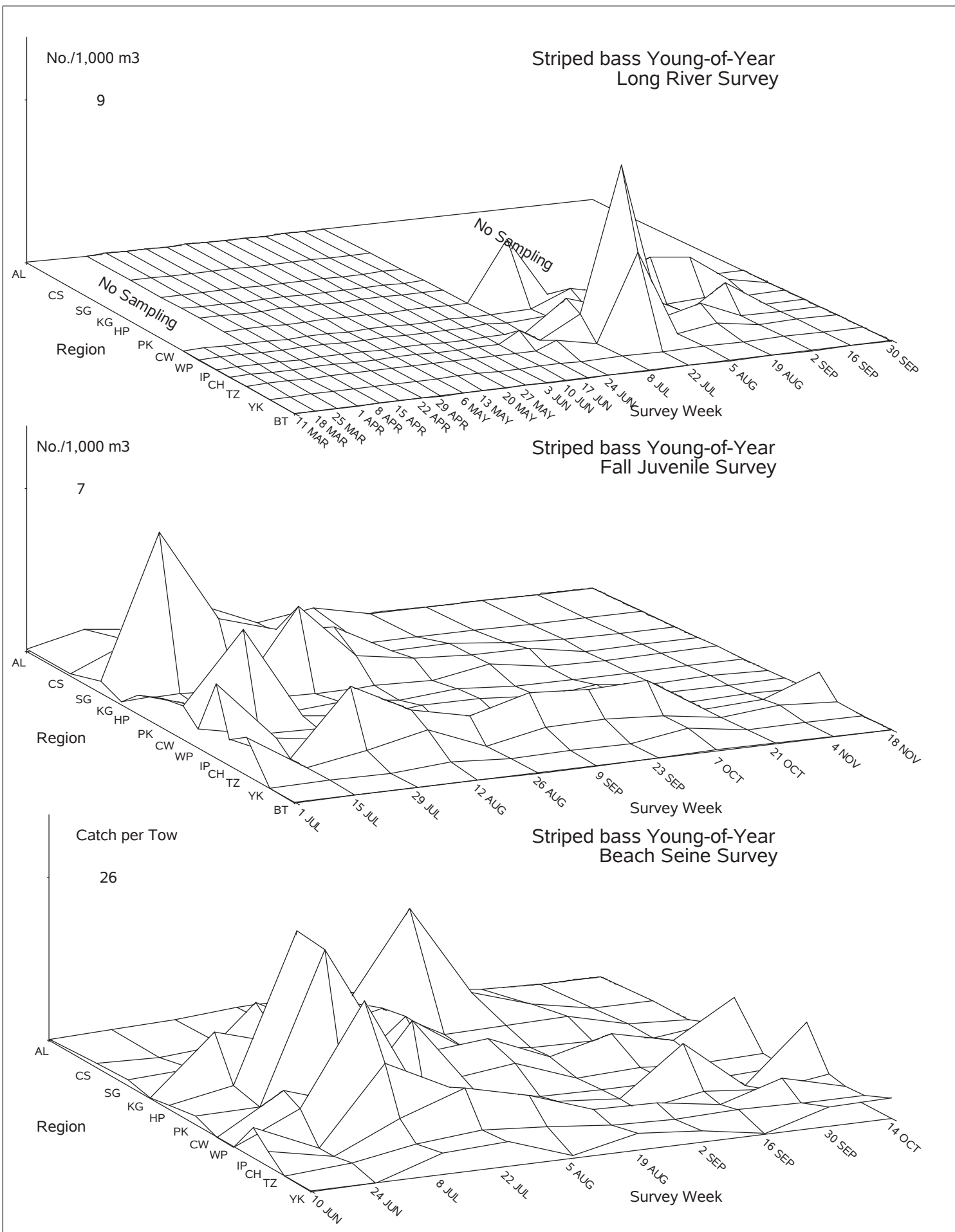


Figure 4-2. Spatiotemporal distribution of young-of-year striped bass in the Hudson River estuary based on the 2013 Long River, Fall Juvenile, and Beach Seine surveys.

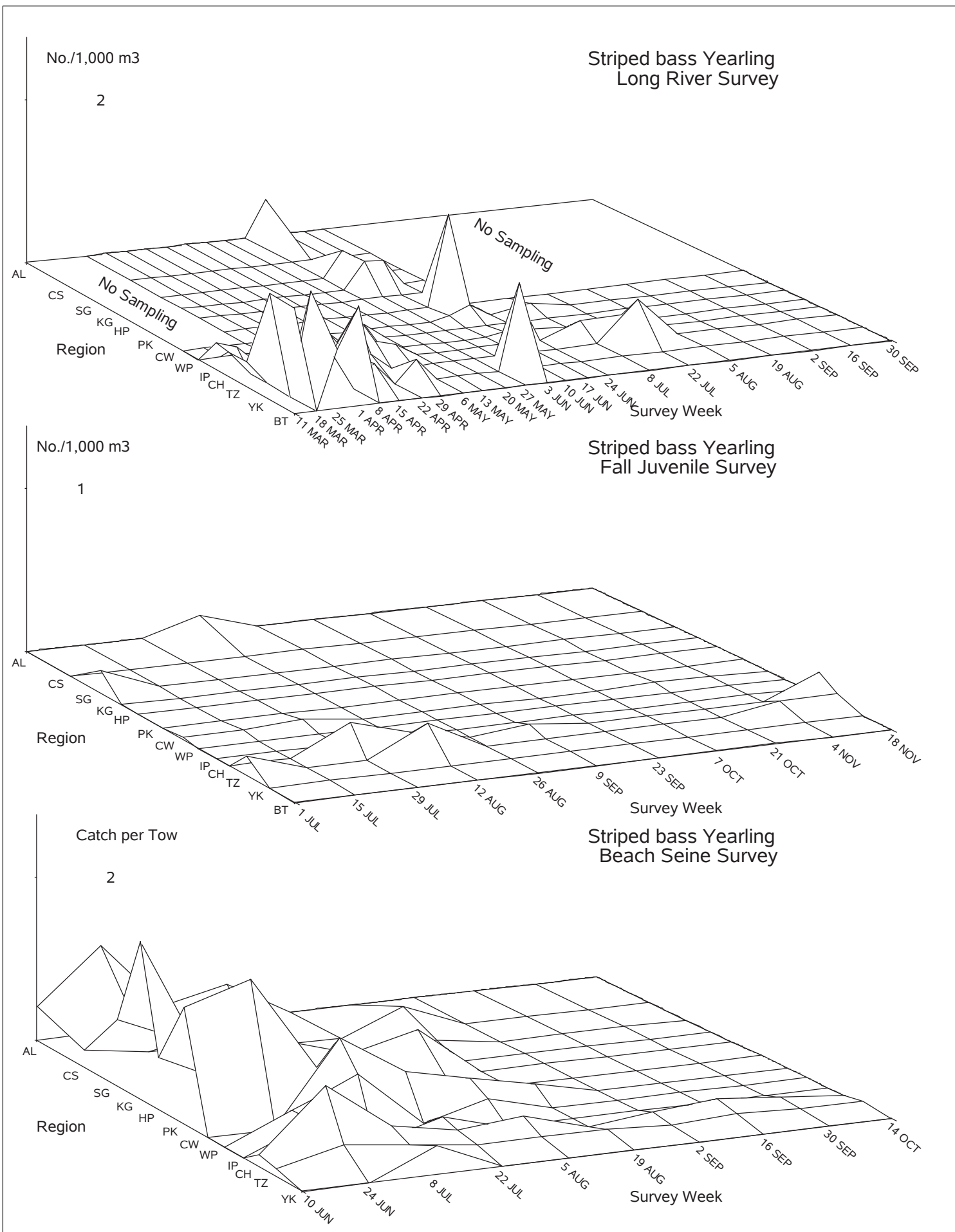


Figure 4-3. Spatiotemporal distribution of yearling striped bass in the Hudson River estuary based on the 2013 Long River, Fall Juvenile, and Beach Seine surveys.

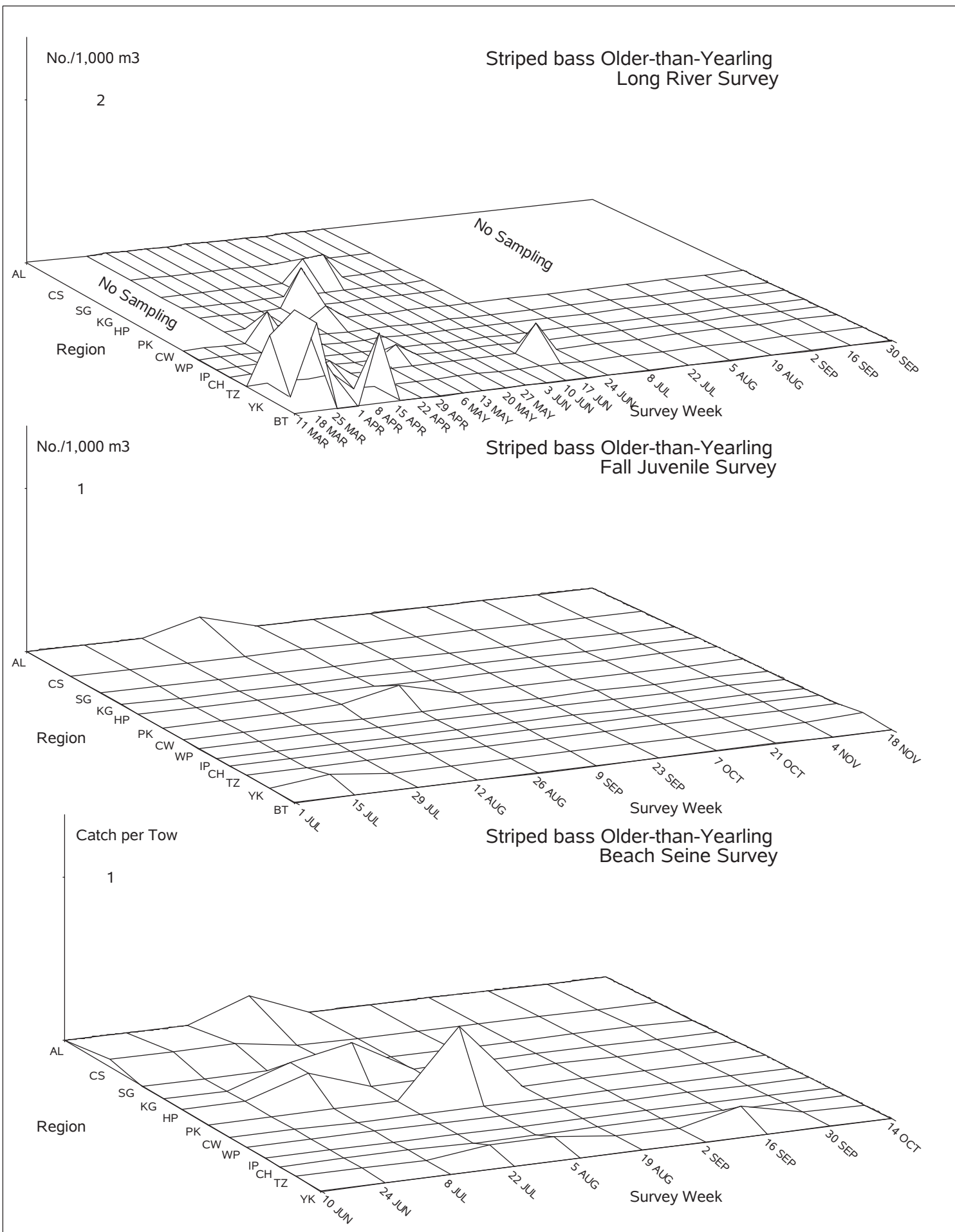


Figure 4-4. Spatiotemporal distribution of older-than-yearling striped bass in the Hudson River estuary based on the 2013 Long River, Fall Juvenile, and Beach Seine surveys.

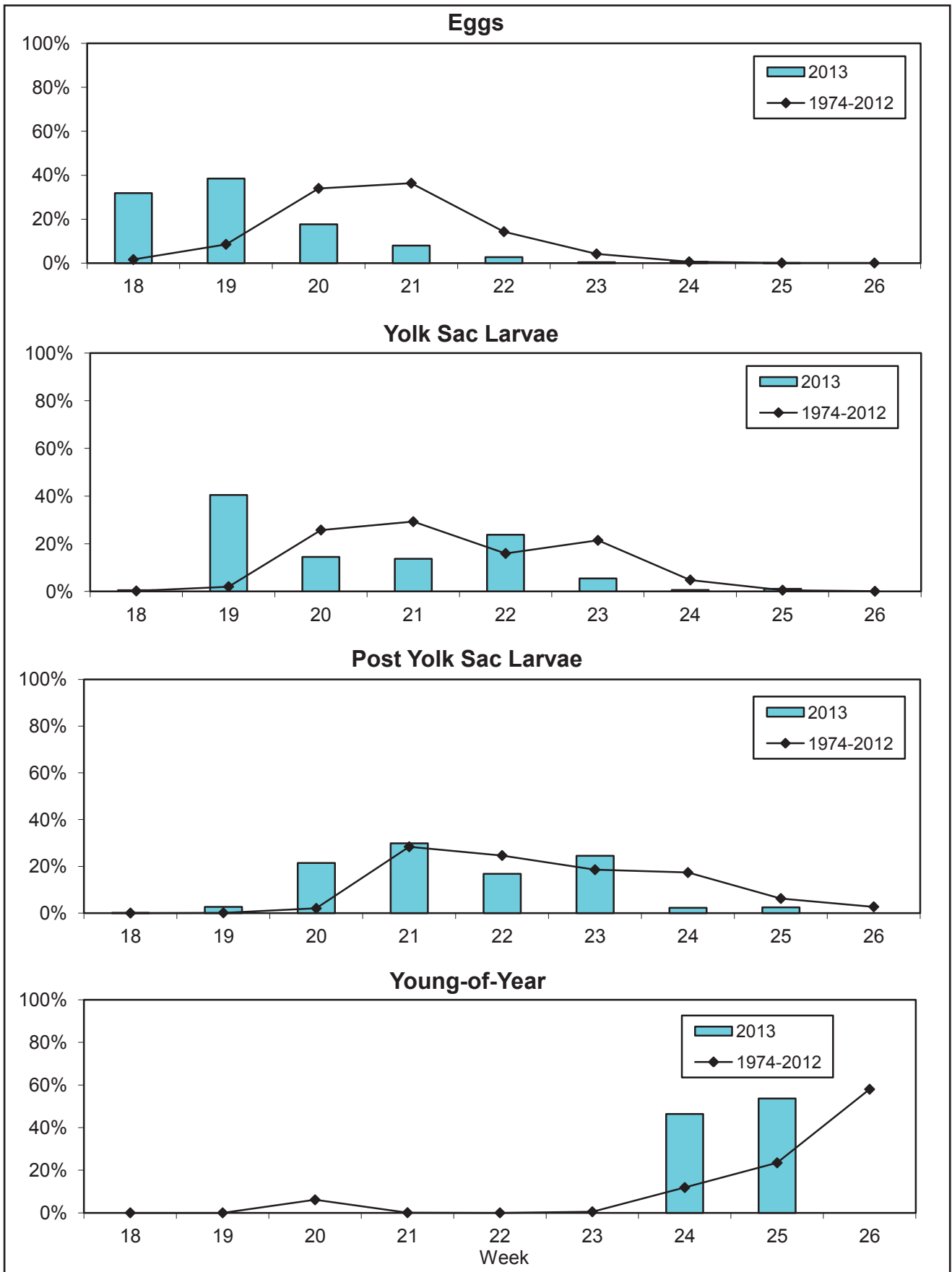


Figure 4-5. Temporal distribution indices for striped bass collected during Long River surveys of the Hudson River estuary, 1974-2013.

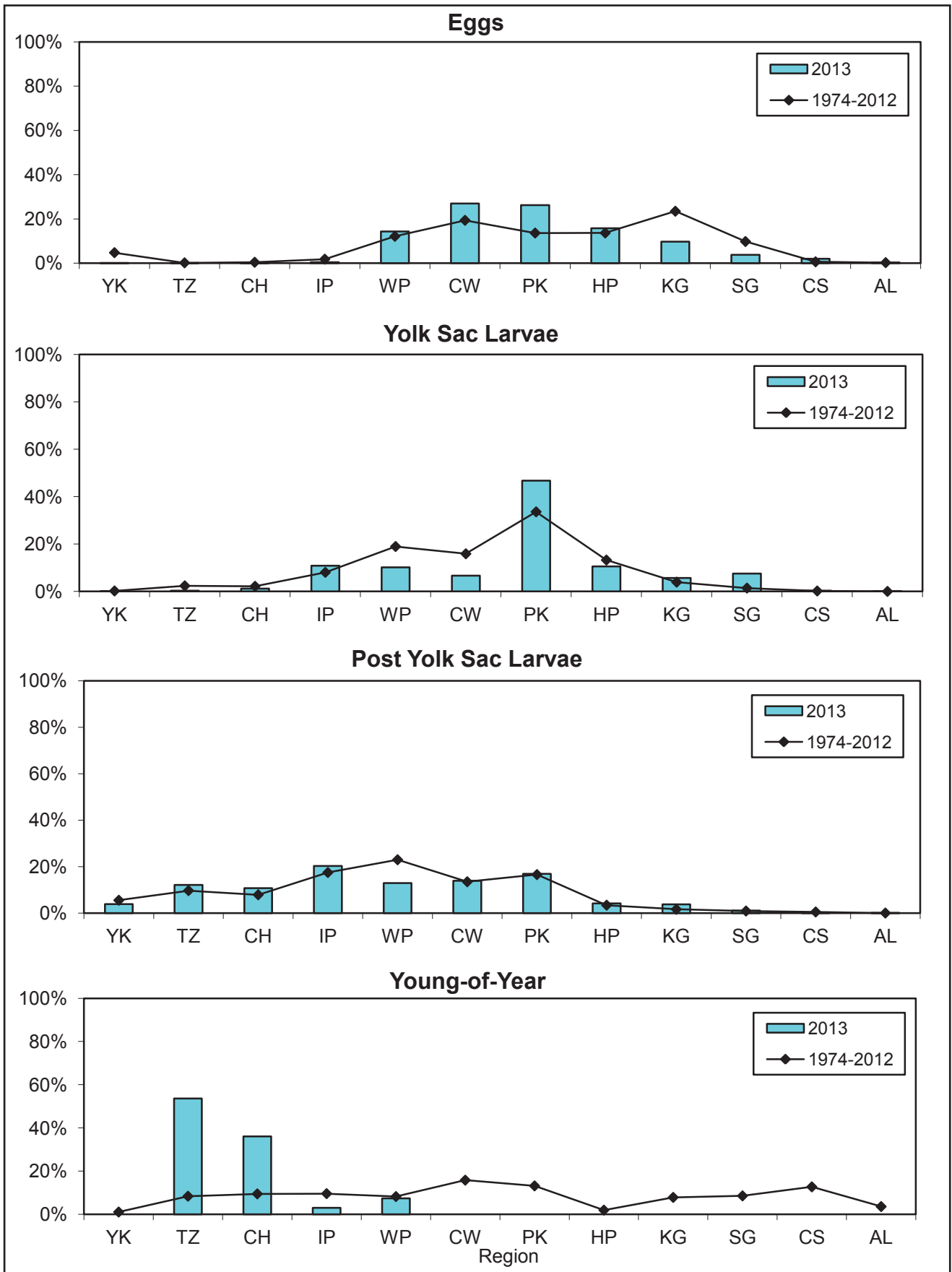


Figure 4-6. Geographic distribution indices for striped bass collected during Long River surveys of the Hudson River estuary, 1974-2013.

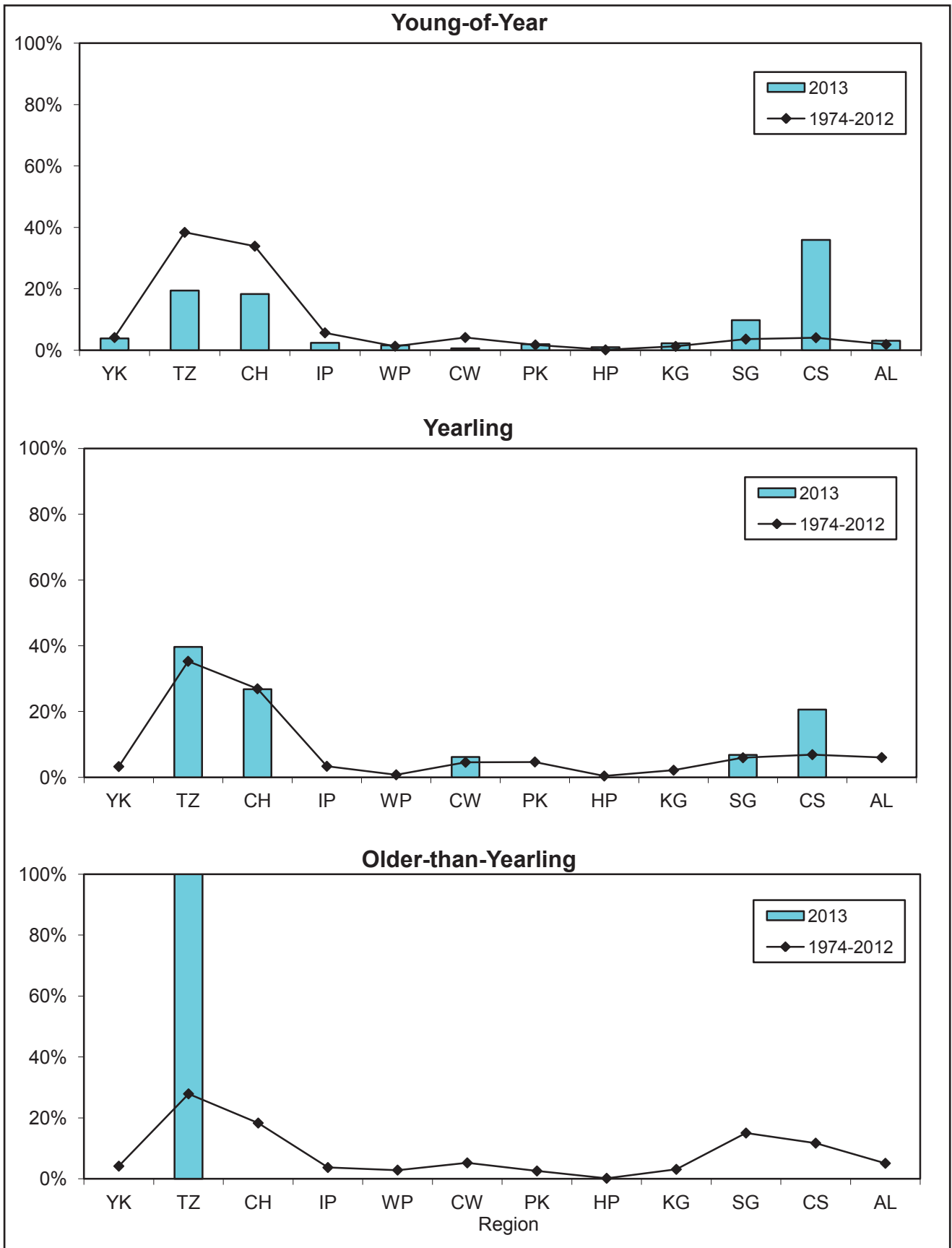


Figure 4-7. Geographic distribution indices for striped bass collected during Beach Seine surveys of the Hudson River estuary, 1974-2013.

# Striped bass

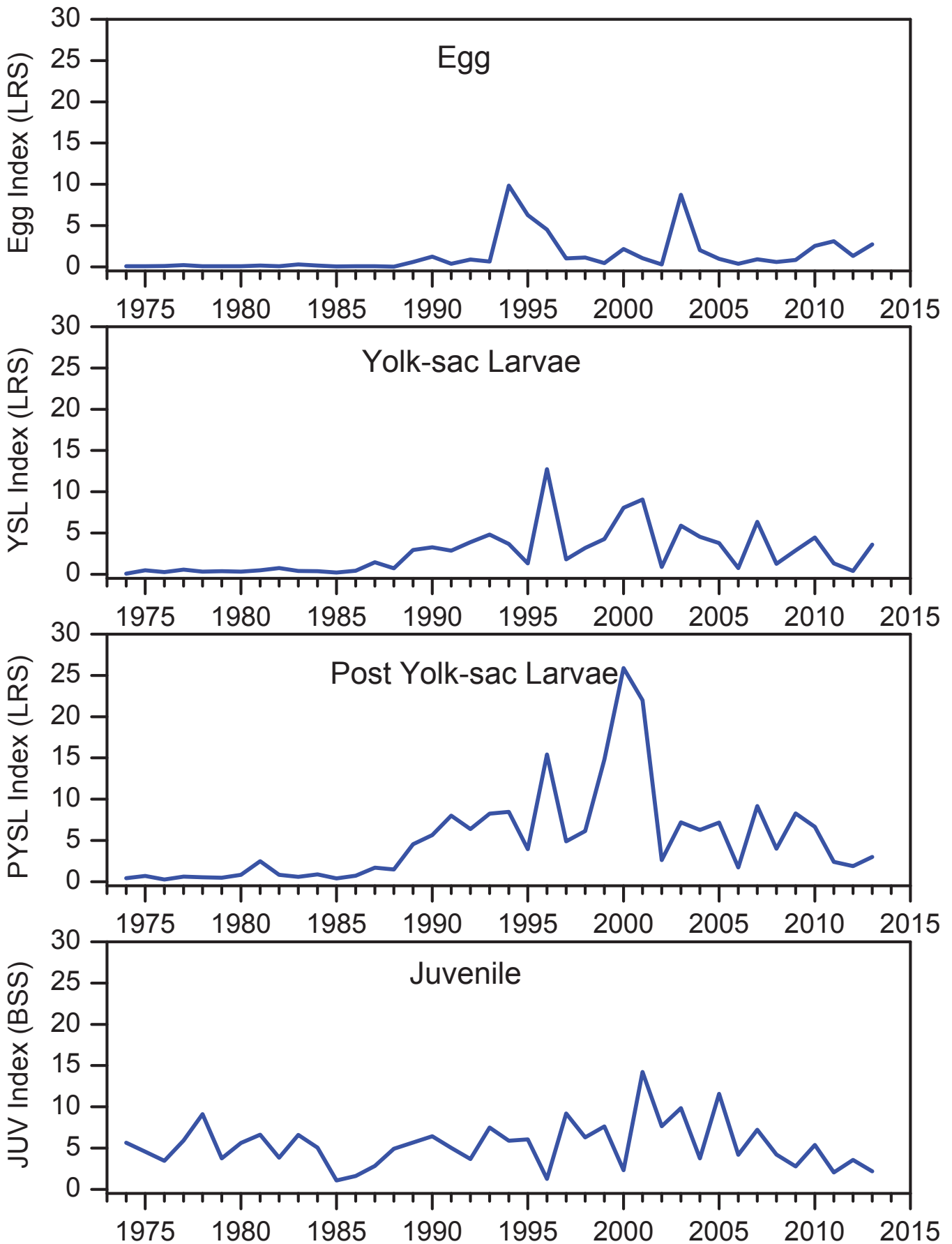


Figure 4-8. Striped bass indices of annual abundance based on Long River Survey and Beach Seine Survey, 1974-2013.



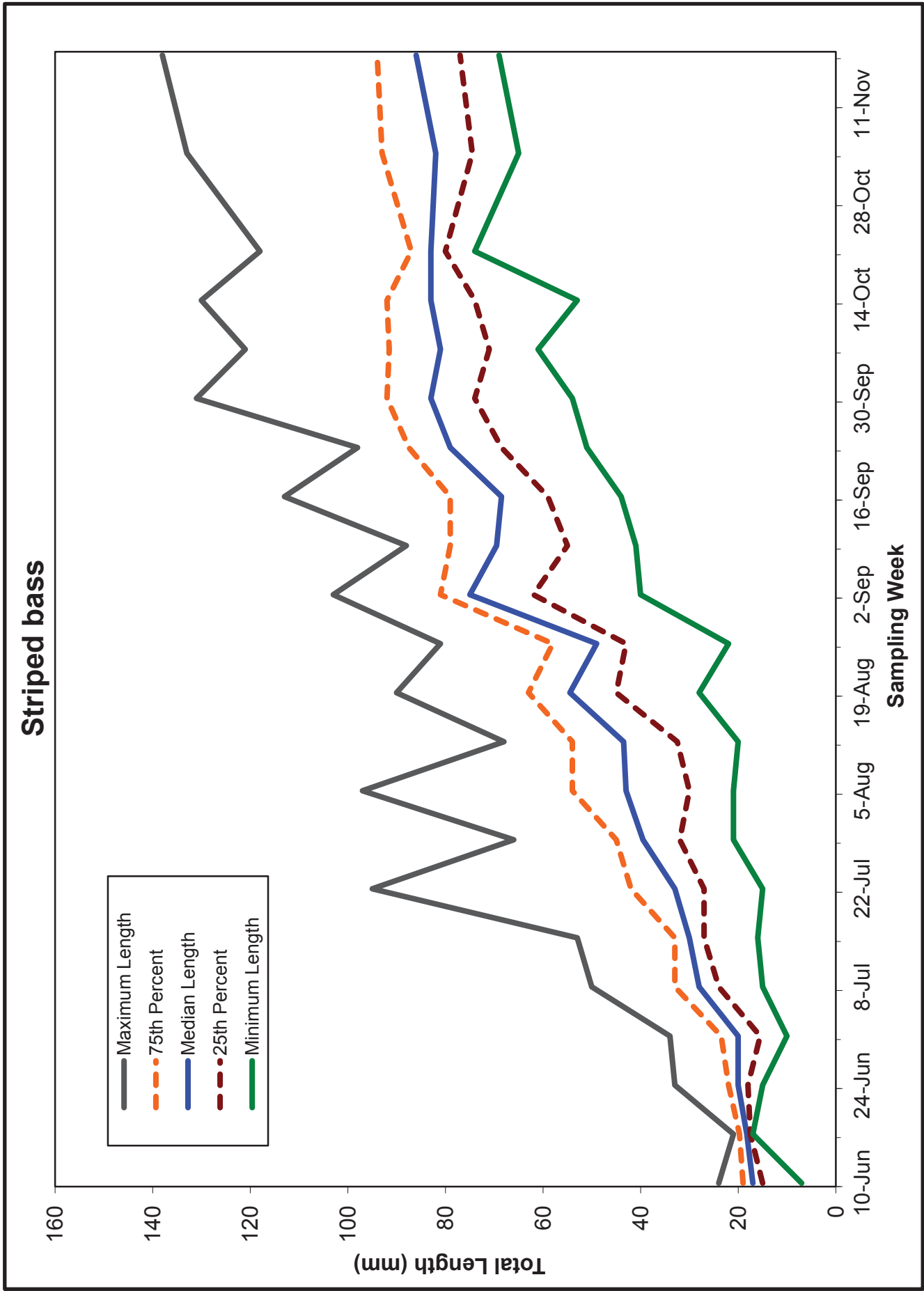


Figure 4-9. Weekly length statistics for young-of-year striped bass in the Hudson River estuary, 2013.

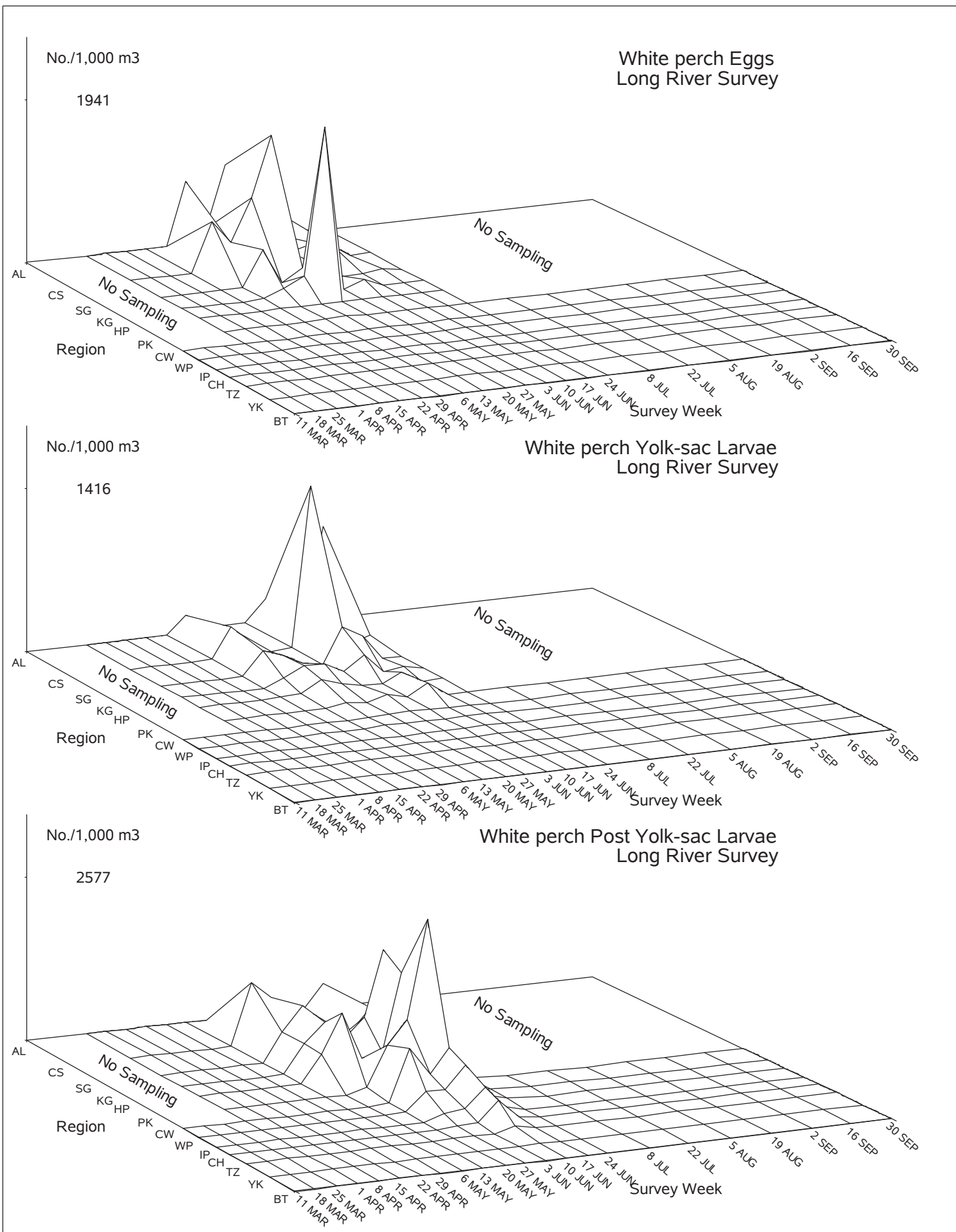


Figure 4-10. Spatiotemporal distribution of eggs, yolk-sac, and post yolk-sac larval white perch in the Hudson River estuary based on the 2013 Long River Survey.

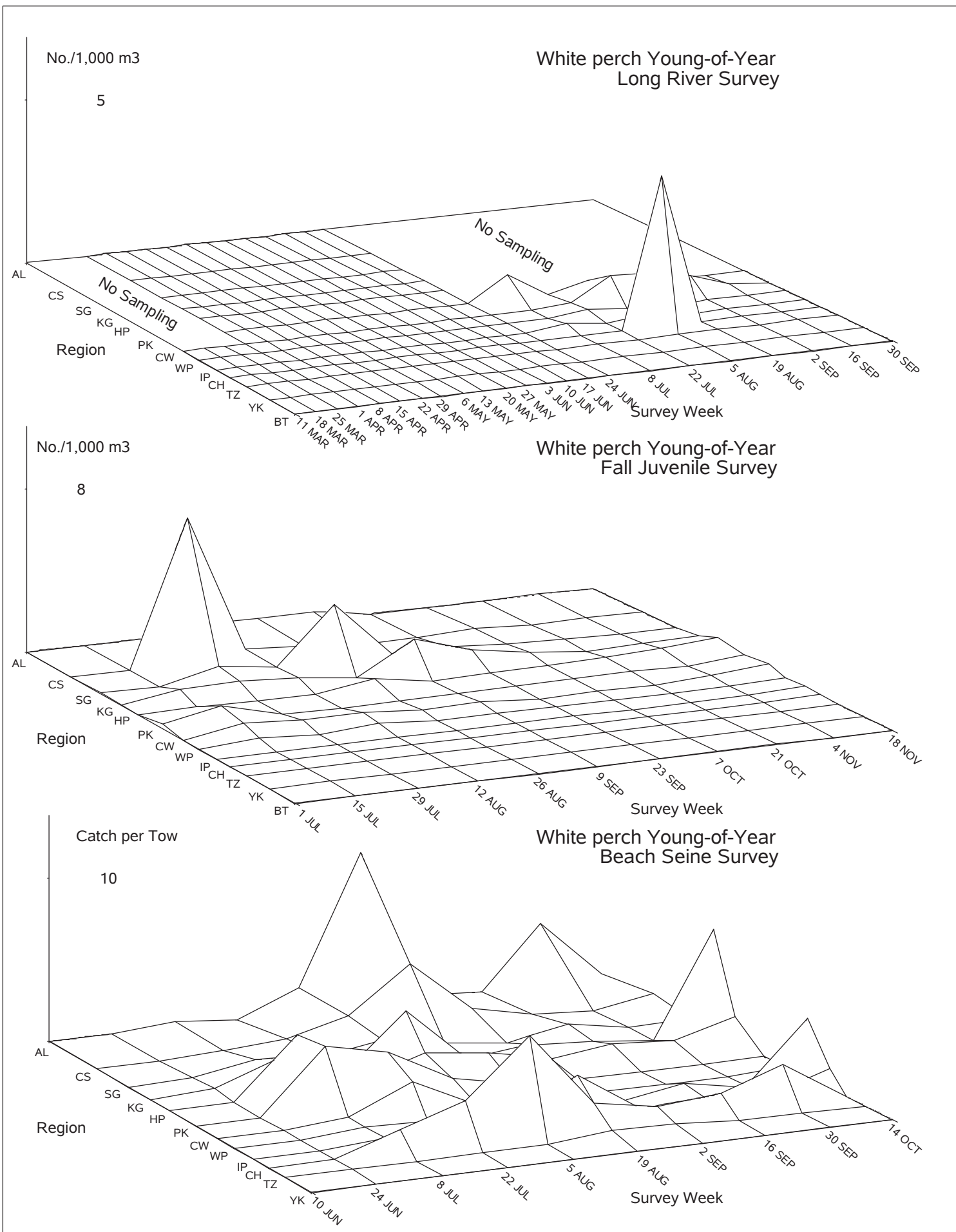


Figure 4-11. Spatiotemporal distribution of young-of-year white perch in the Hudson River estuary based on the 2013 Long River, Fall Juvenile, and Beach Seine surveys.

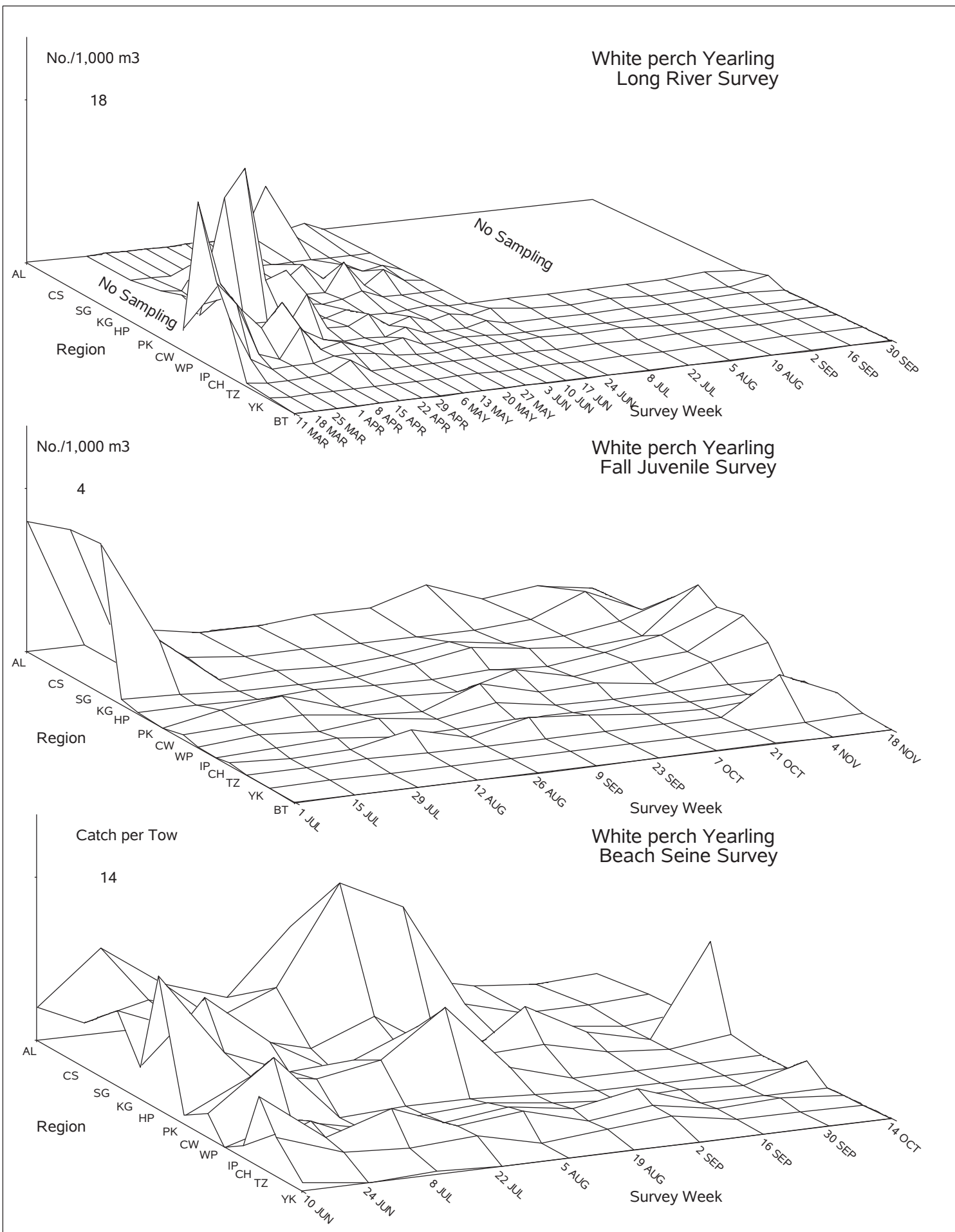


Figure 4-12. Spatiotemporal distribution of yearling white perch in the Hudson River estuary based on the 2013 Long River, Fall Juvenile, and Beach Seine surveys.

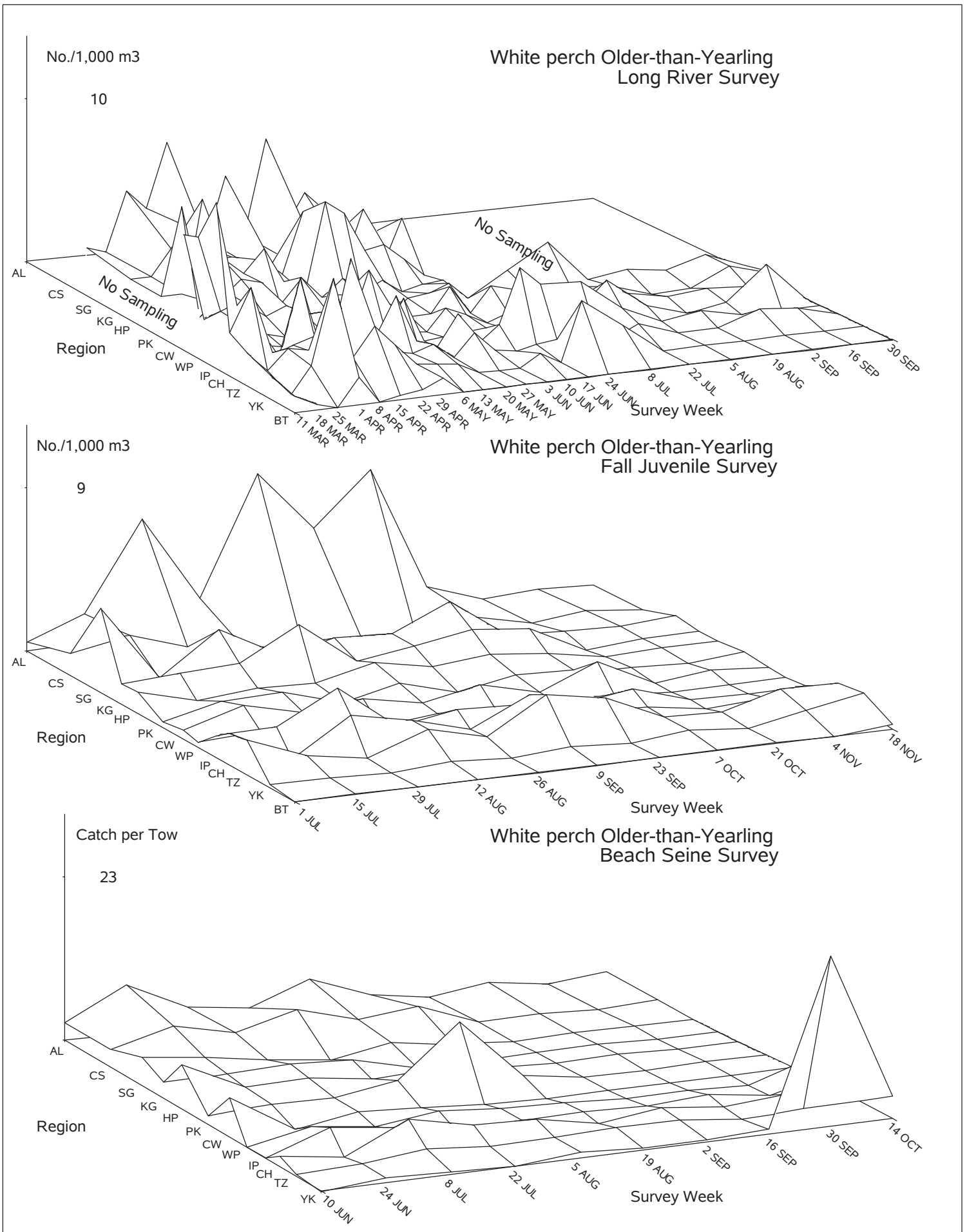


Figure 4-13. Spatiotemporal distribution of older-than-yearling white perch in the Hudson River estuary based on the 2013 Long River, Fall Juvenile, and Beach Seine surveys.

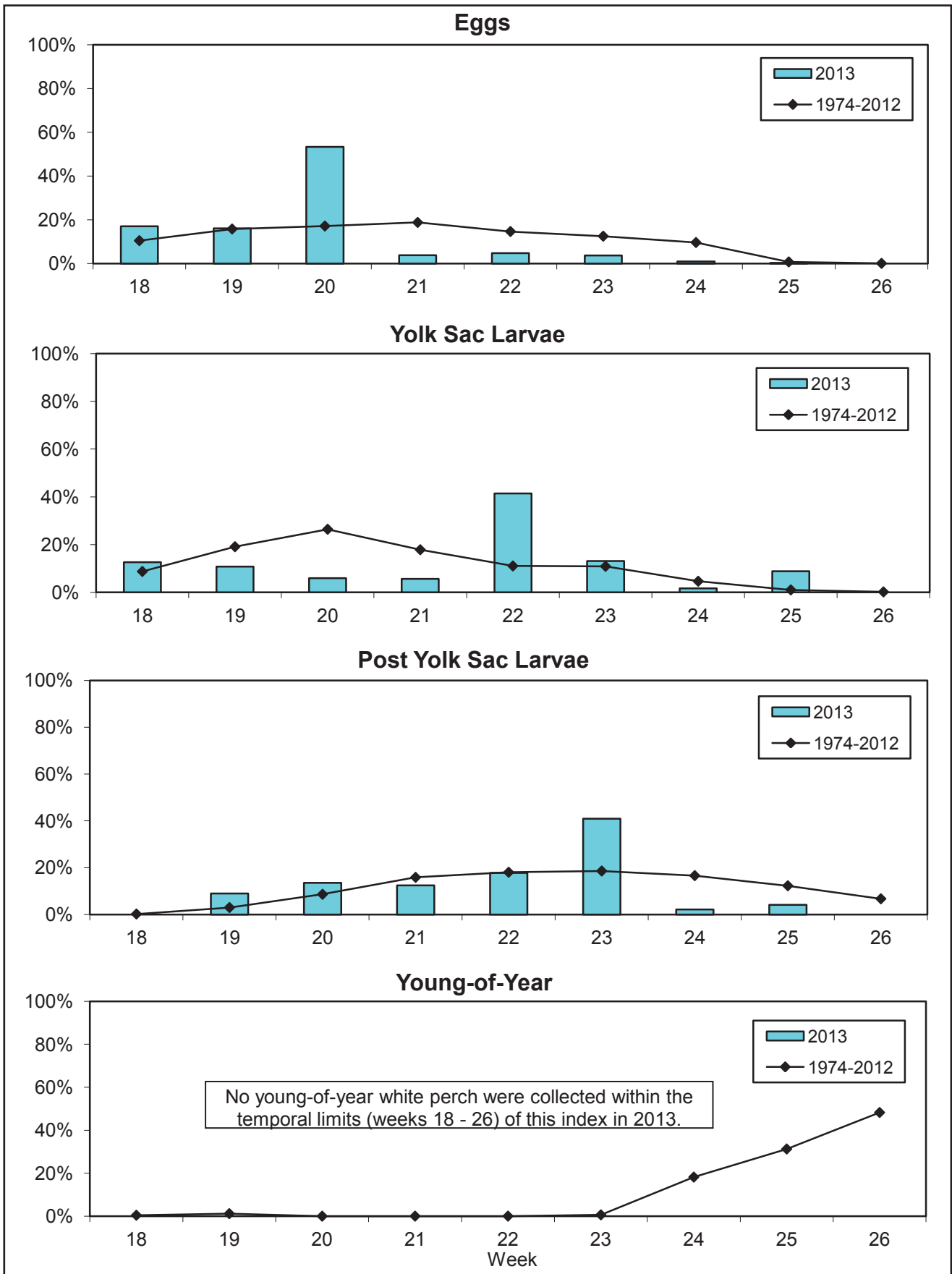


Figure 4-14. Temporal distribution indices for white perch collected during Long River surveys of the Hudson River estuary, 1974-2013.

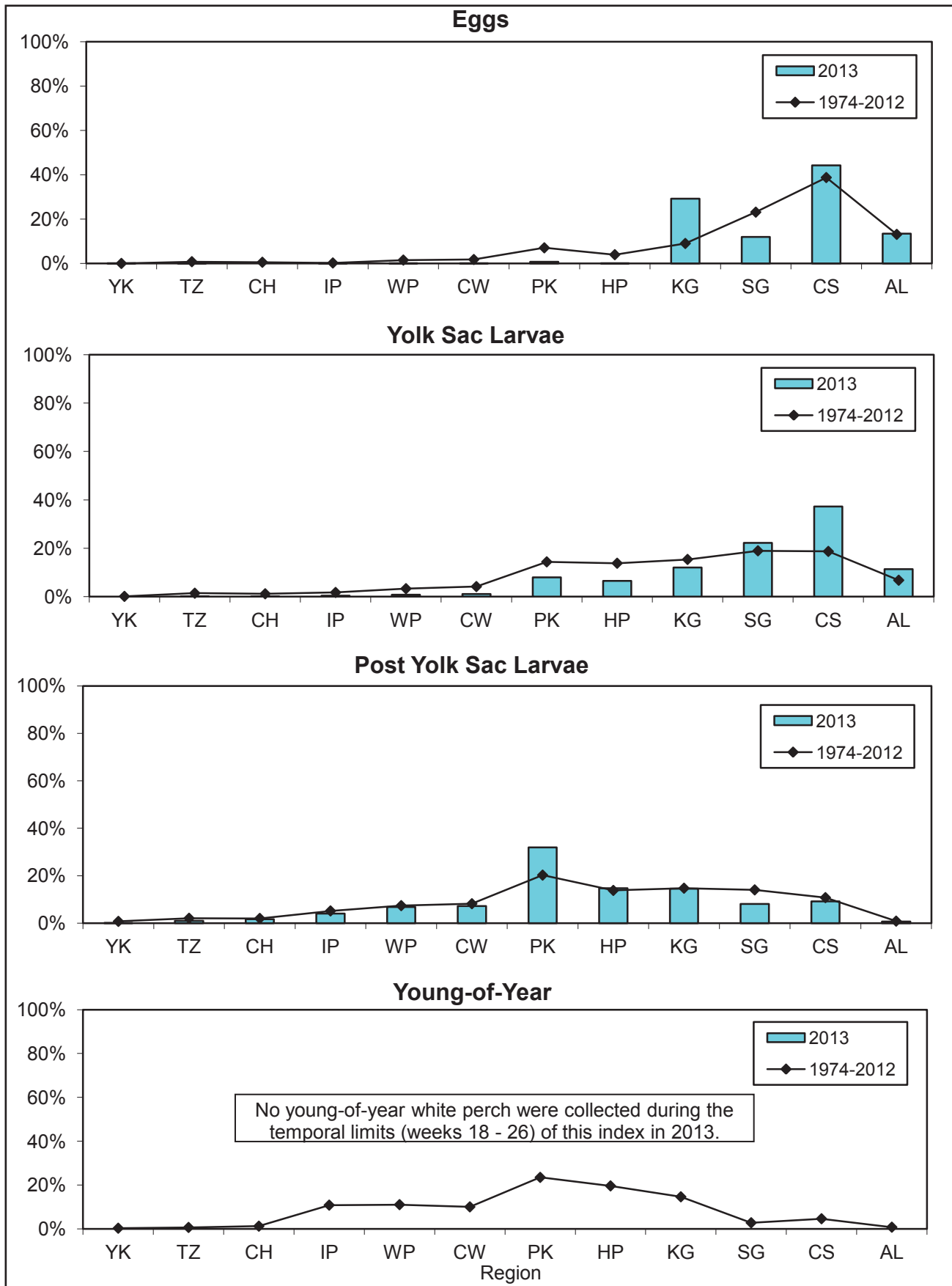


Figure 4-15. Geographic distribution indices for white perch collected during Long River surveys of the Hudson River estuary, 1974-2013.

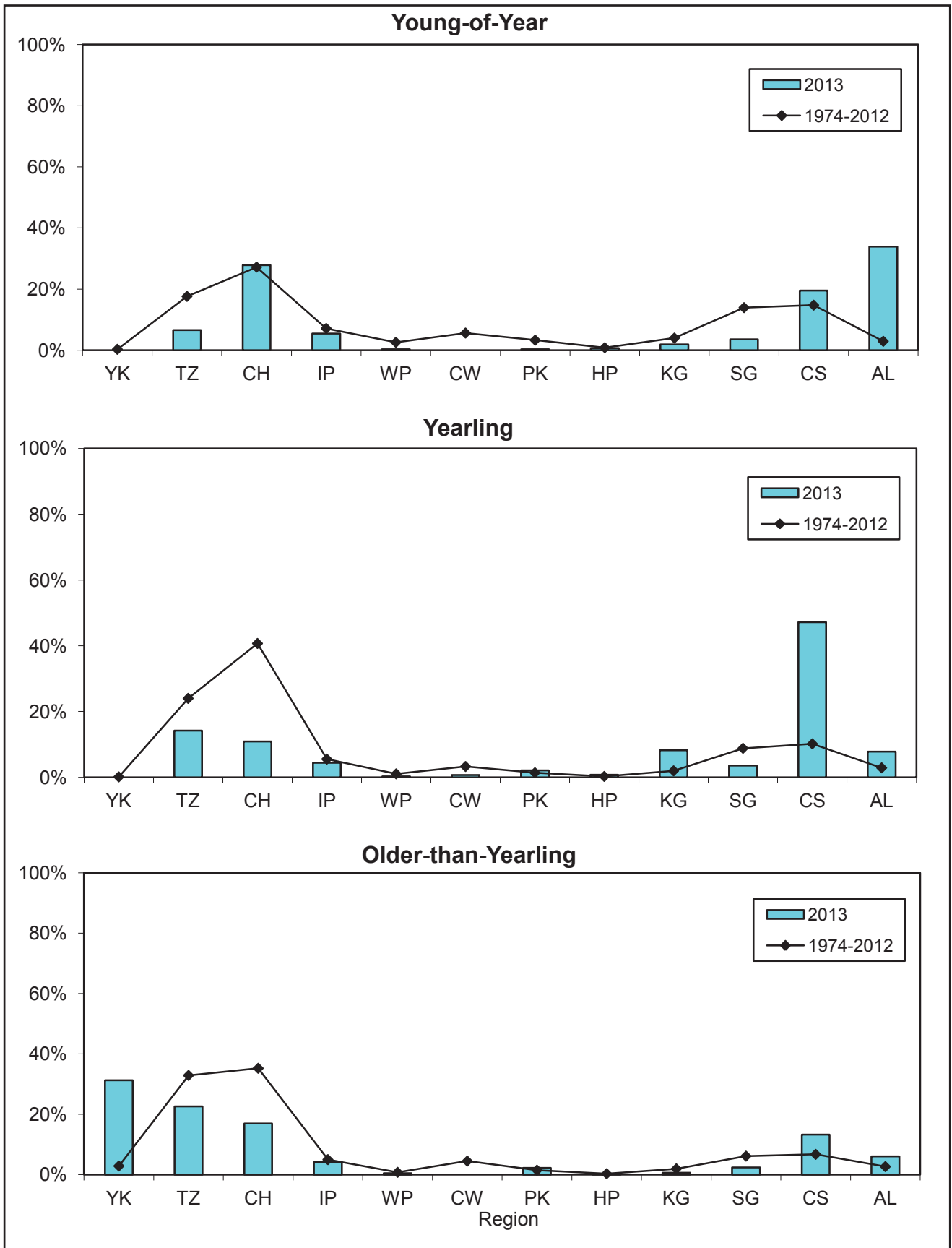


Figure 4-16. Geographic distribution indices for white perch collected during Beach Seine surveys of the Hudson River estuary, 1974-2013.



# White perch

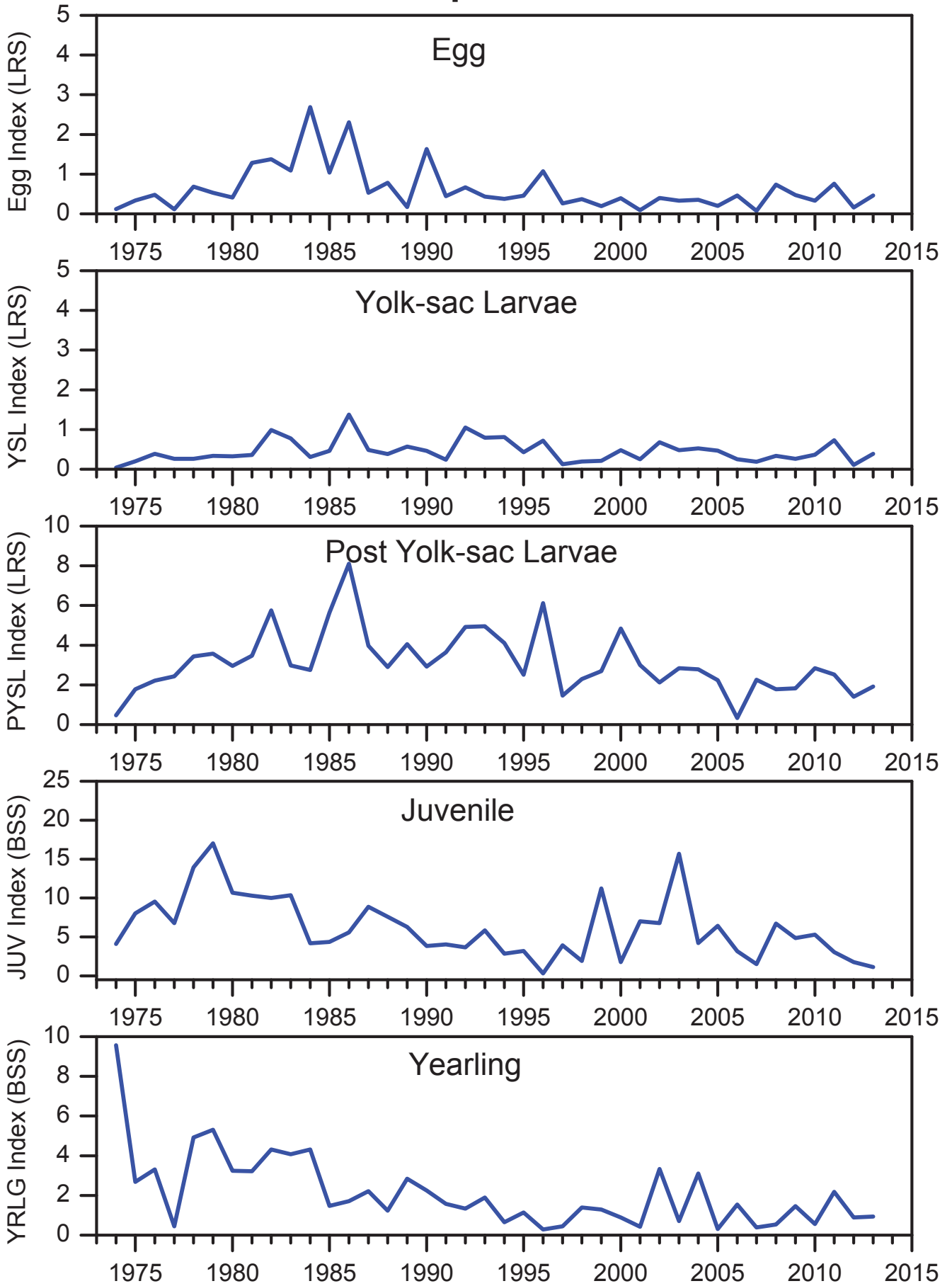


Figure 4-17. White perch indices of annual abundance based on Long River Survey and Beach Seine Survey, 1974-2013.

# White perch

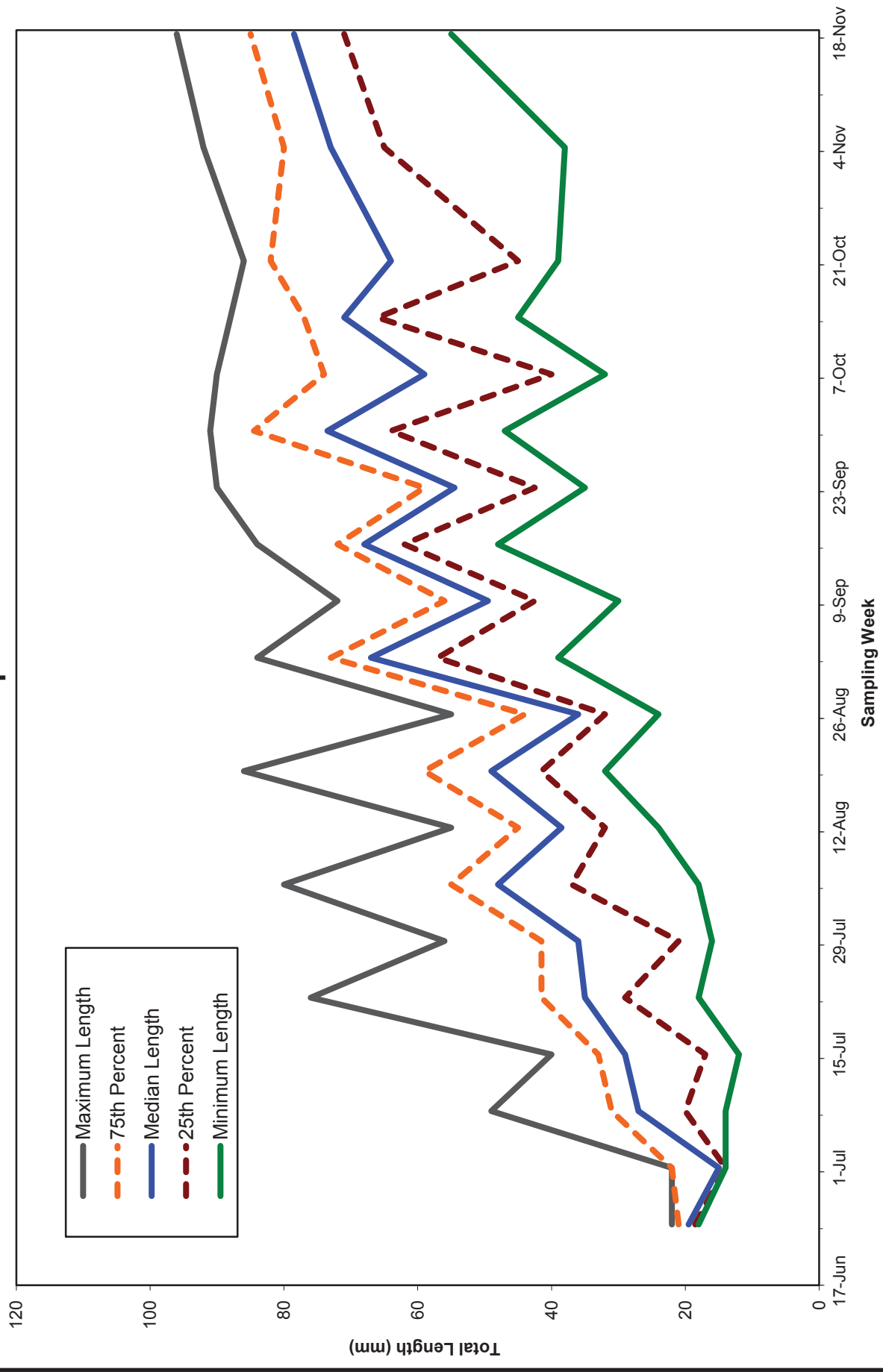


Figure 4-18. Weekly length statistics for young-of-year white perch in the Hudson River estuary, 2013.

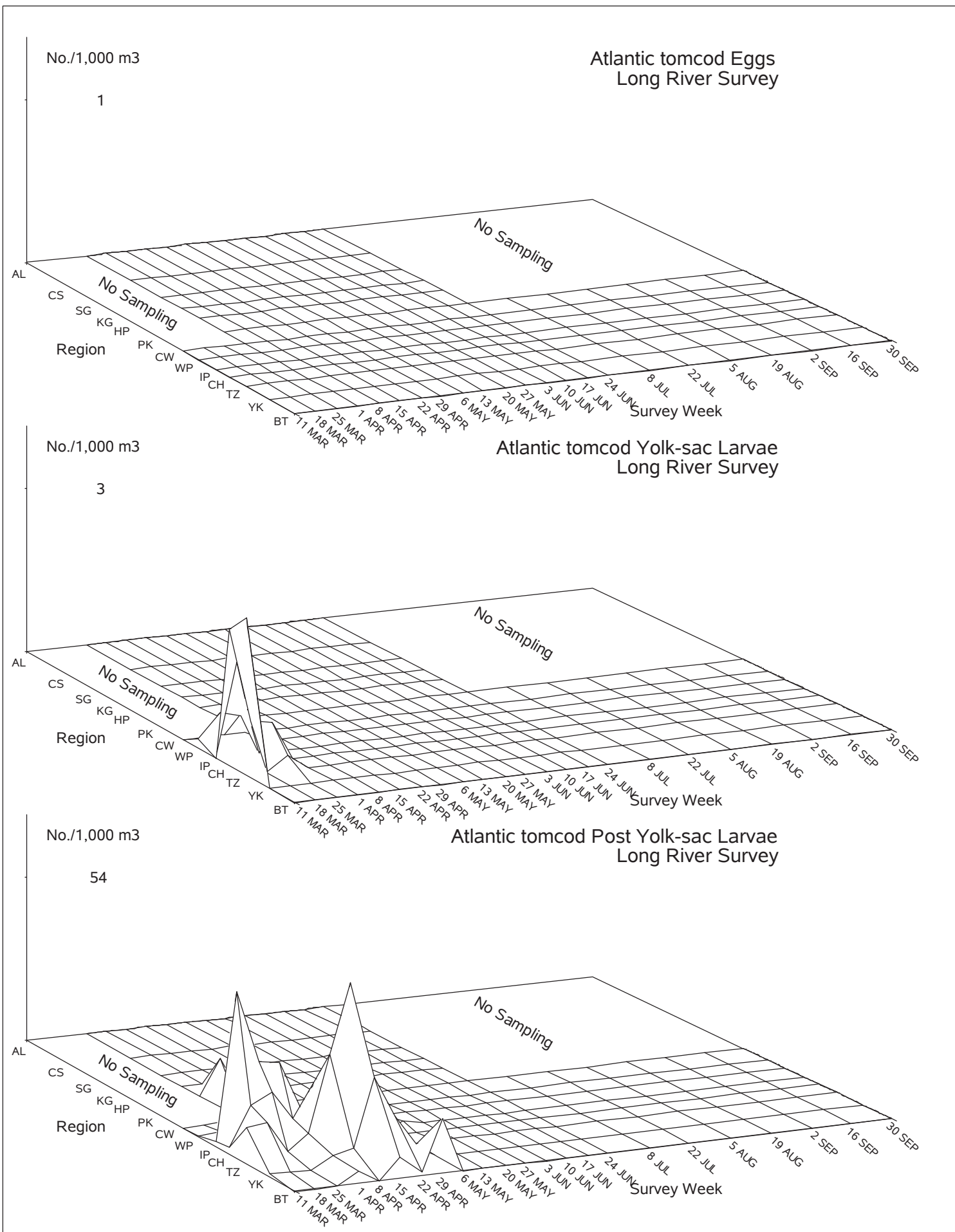


Figure 4-19. Spatiotemporal distribution of eggs, yolk-sac, and post yolk-sac larval Atlantic tomcod in the Hudson River estuary based on the 2013 Long River Survey.

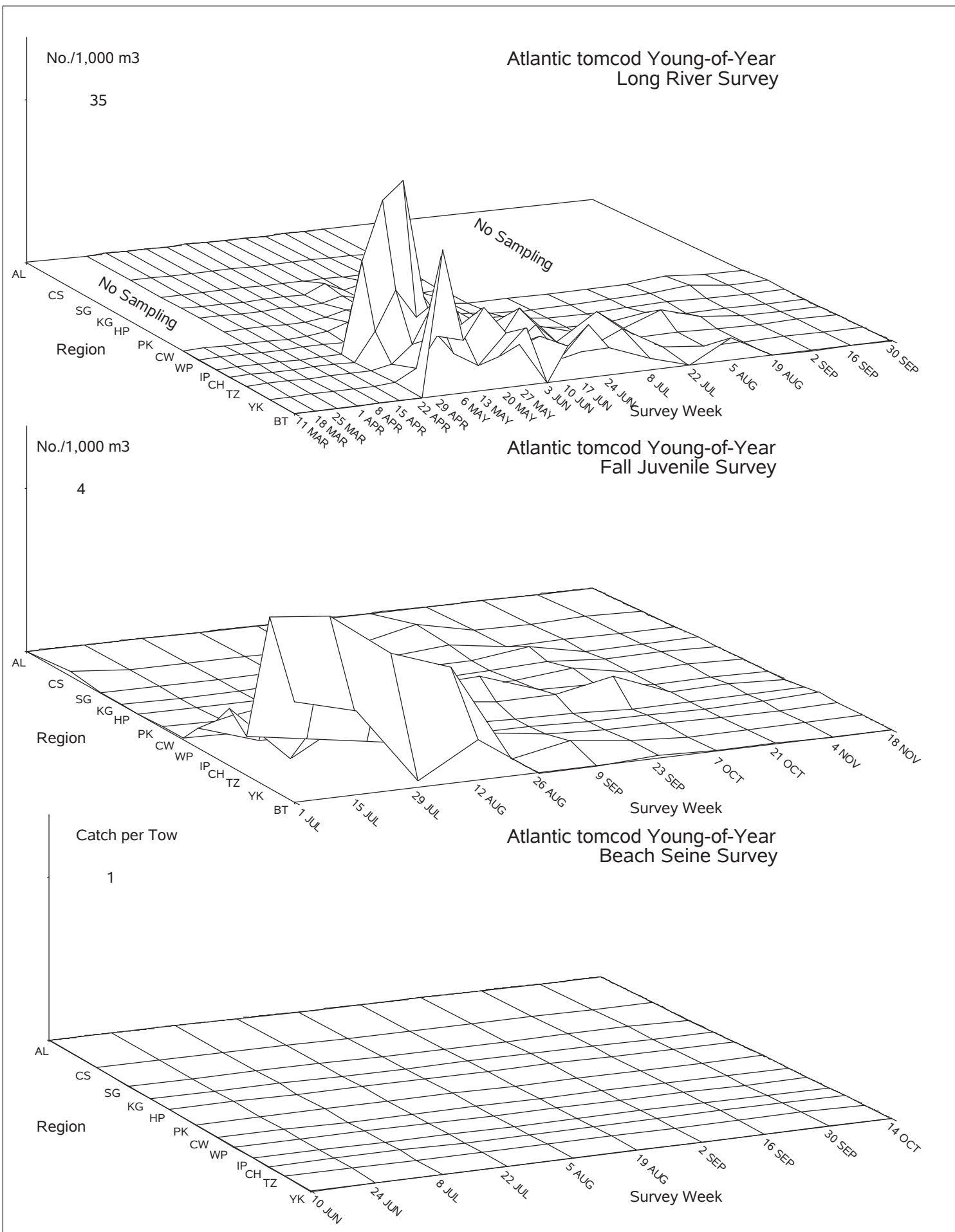


Figure 4-20. Spatiotemporal distribution of young-of-year Atlantic tomcod in the Hudson River estuary based on the 2013 Long River, Fall Juvenile, and Beach Seine surveys.

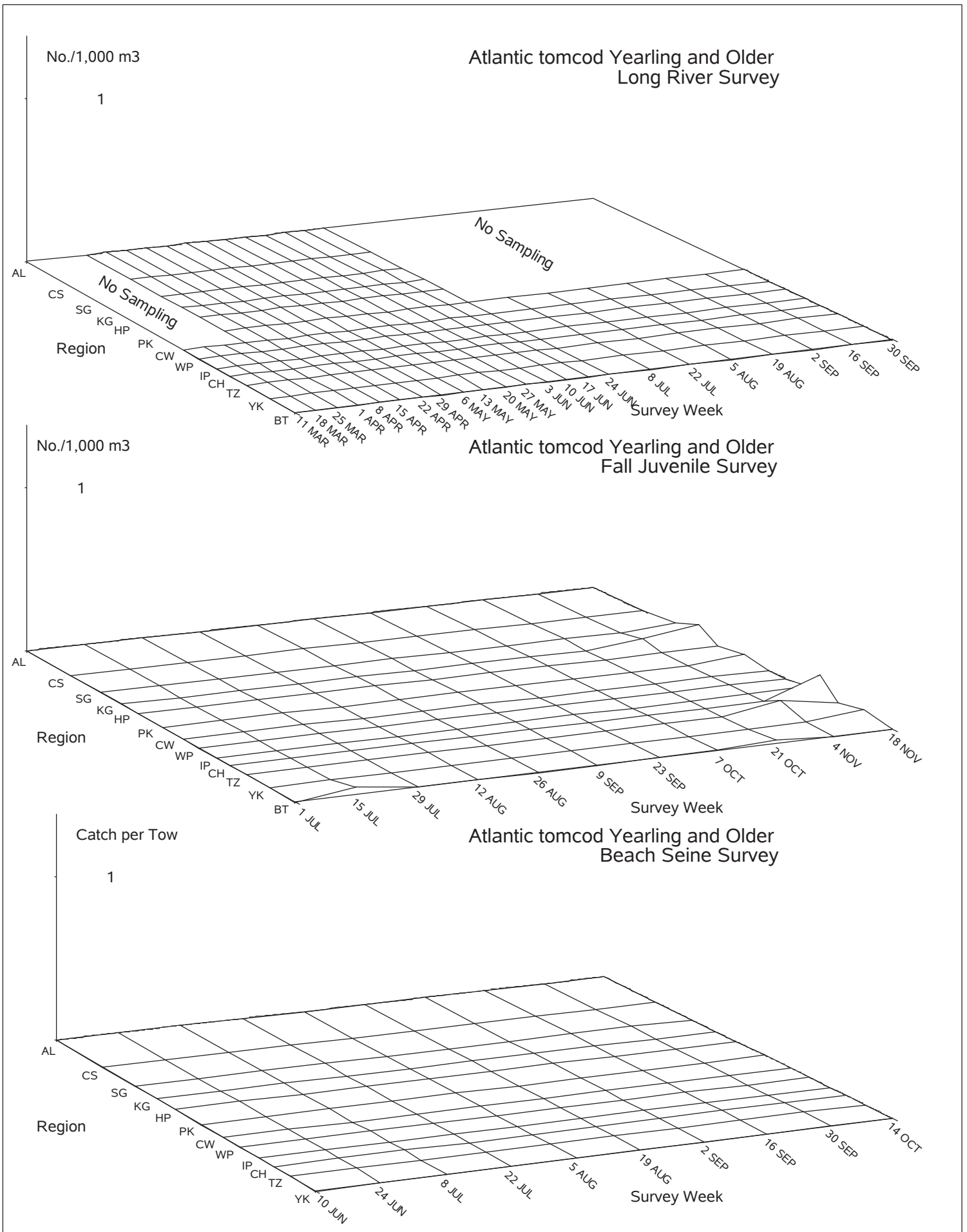


Figure 4-21. Spatiotemporal distribution of yearling and older Atlantic tomcod in the Hudson River estuary based on the 2013 Long River, Fall Juvenile, and Beach Seine surveys.

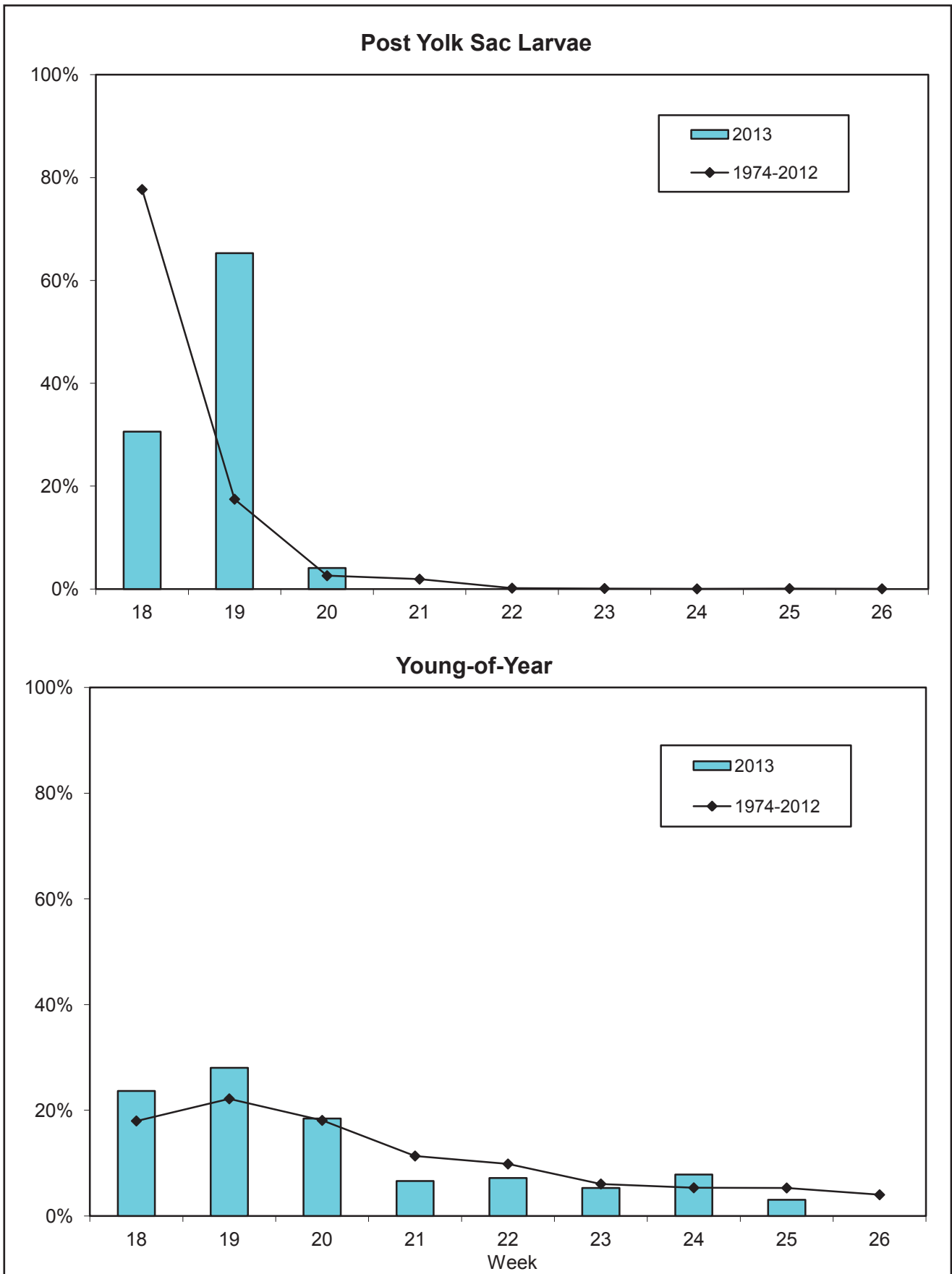


Figure 4-22. Temporal distribution indices for Atlantic tomcod collected during Long River surveys of the Hudson River estuary, 1974-2013.

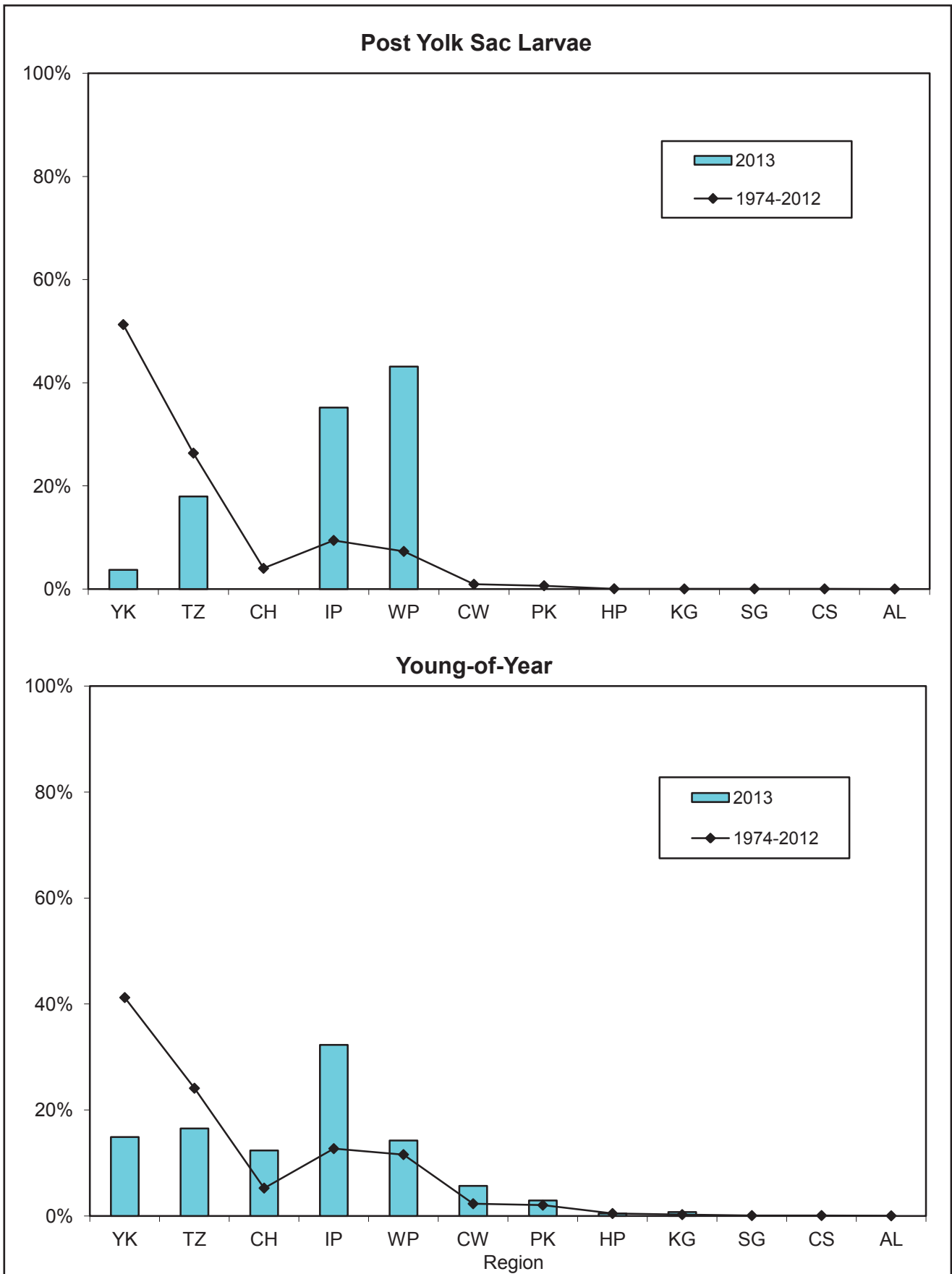


Figure 4-23. Geographic distribution indices for Atlantic tomcod collected during Long River surveys of the Hudson River estuary, 1974-2013.

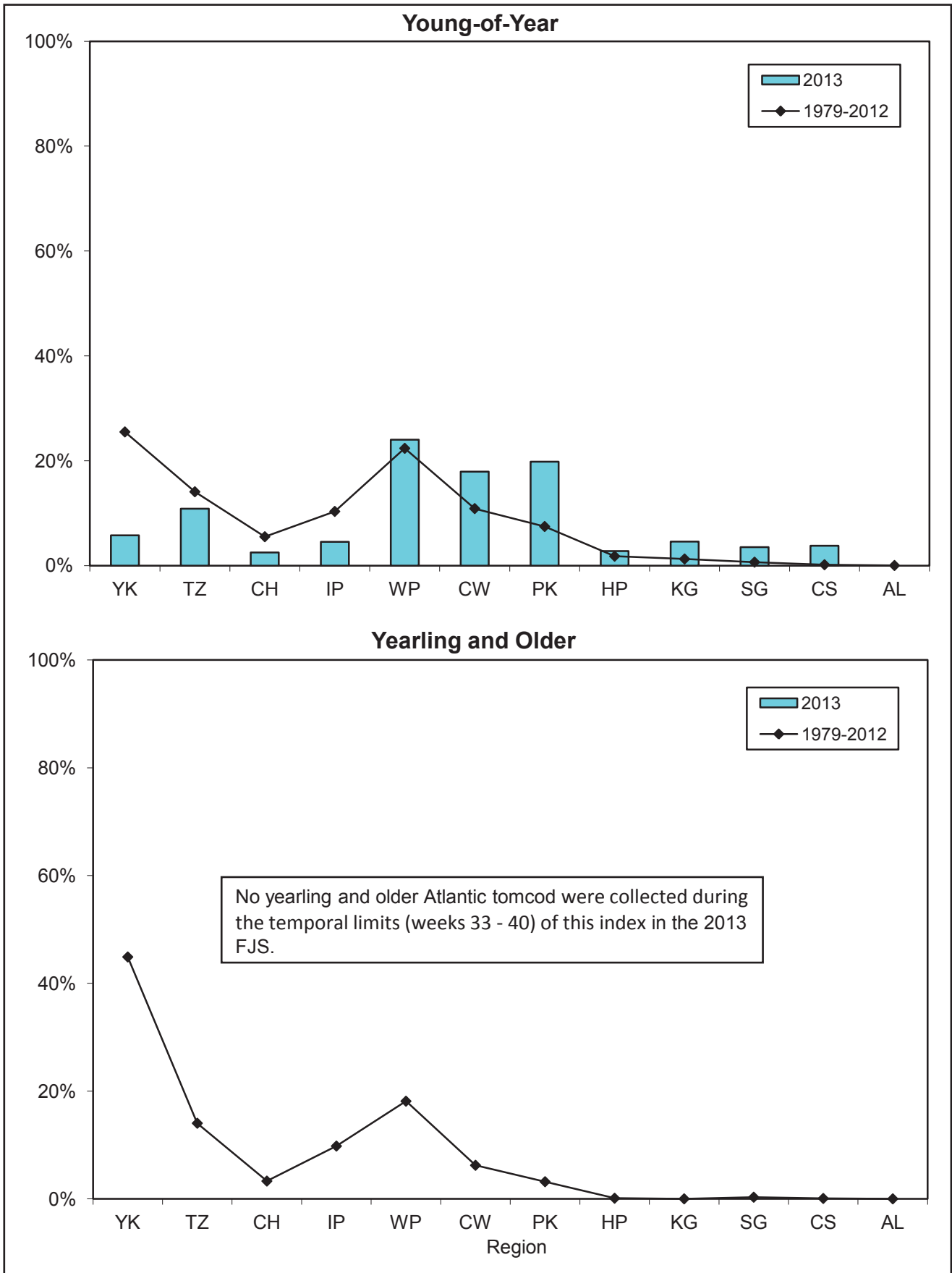


Figure 4-24. Geographic distribution indices for Atlantic tomcod collected during Fall Juvenile surveys of the Hudson River estuary, 1979-2013.



# Atlantic tomcod

Post Yolk-sac Larvae and Juvenile

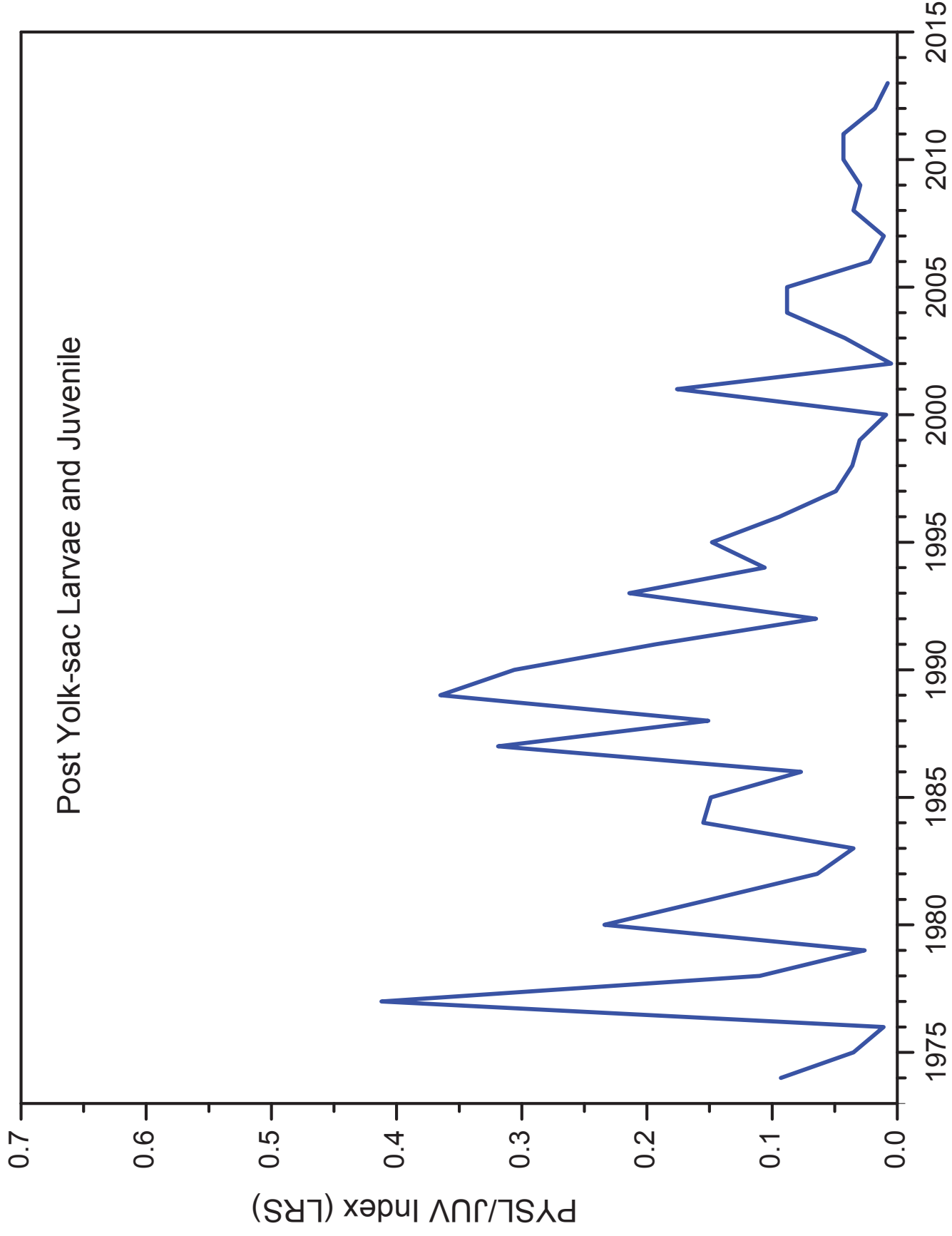


Figure 4-25. Atlantic tomcod indices of annual abundance based on Long River Survey, 1974-2013.

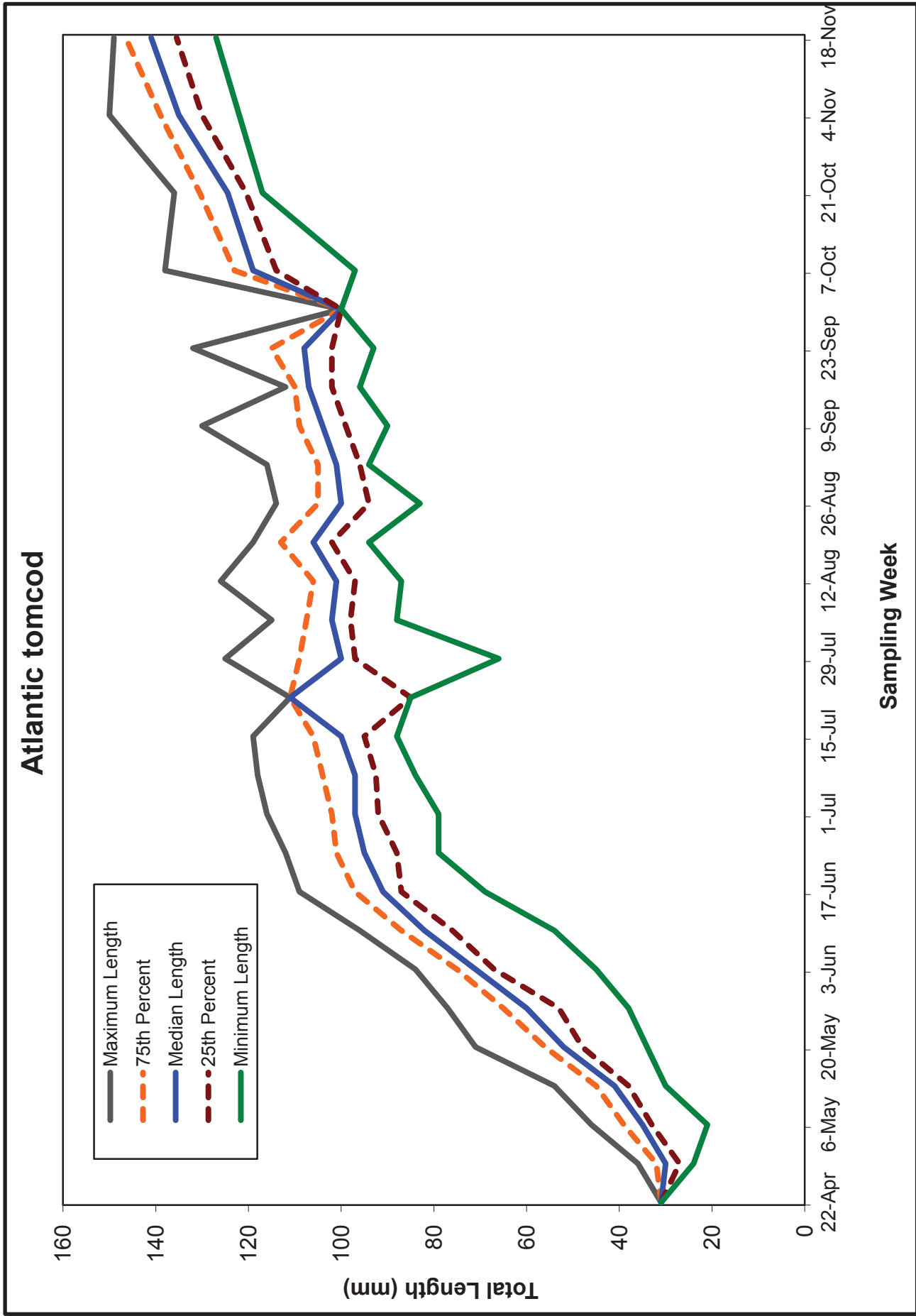


Figure 4-26. Weekly length statistics for young-of-year Atlantic tomcod in the Hudson River estuary, 2013.

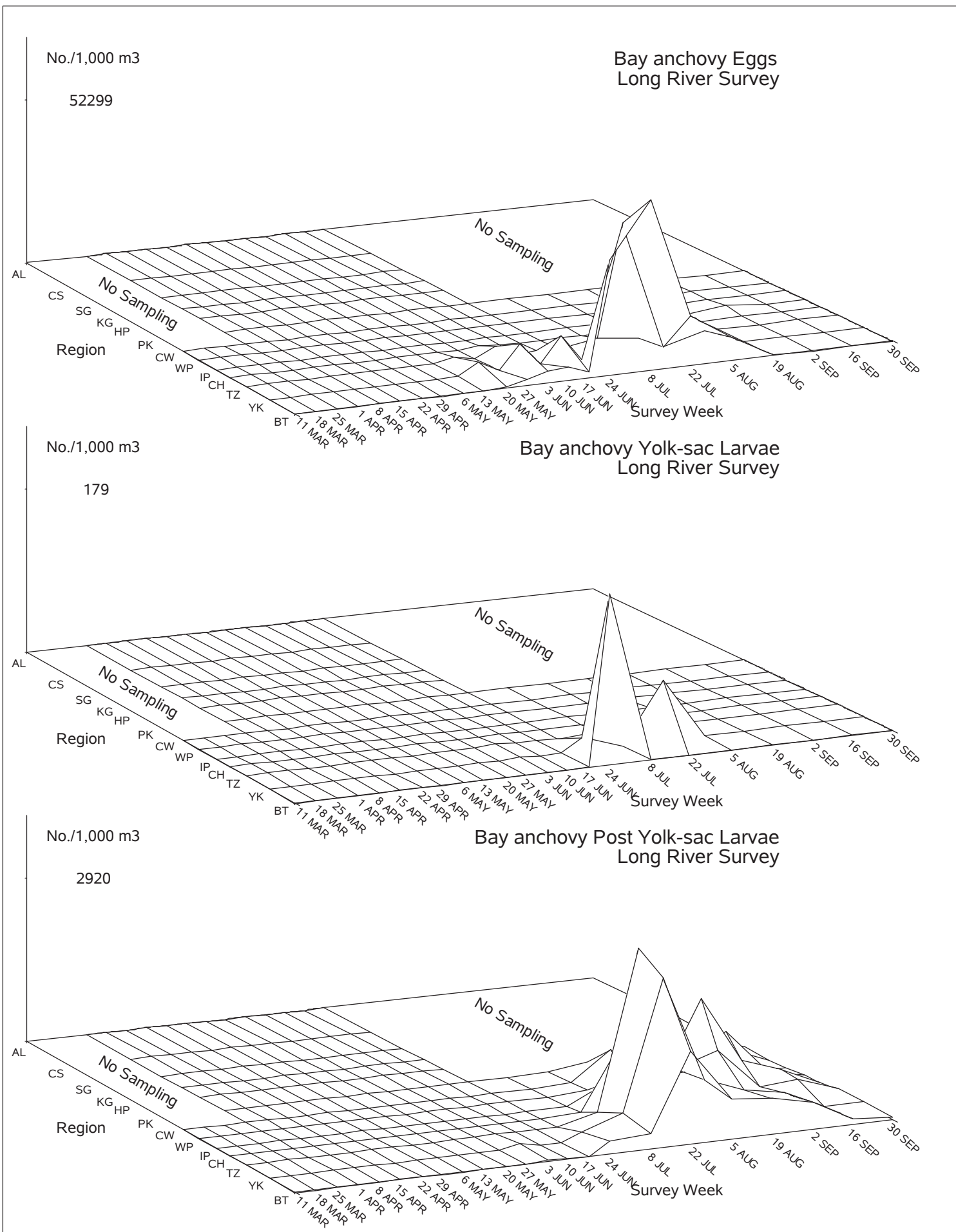


Figure 4-27. Spatiotemporal distribution of eggs, yolk-sac, and post yolk-sac larval bay anchovy in the Hudson River estuary based on the 2013 Long River Survey.

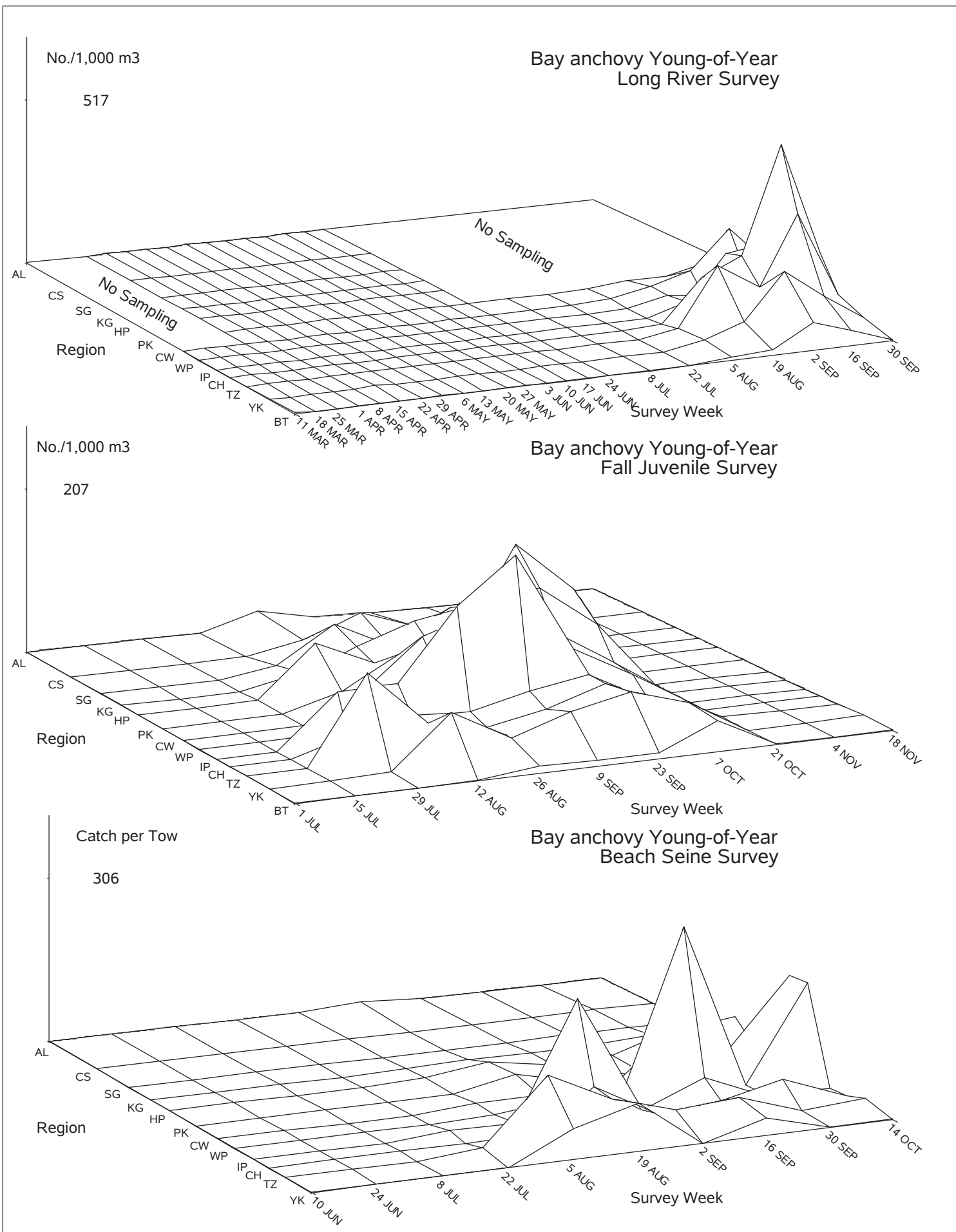


Figure 4-28. Spatiotemporal distribution of young-of-year bay anchovy in the Hudson River estuary based on the 2013 Long River, Fall Juvenile, and Beach Seine surveys.

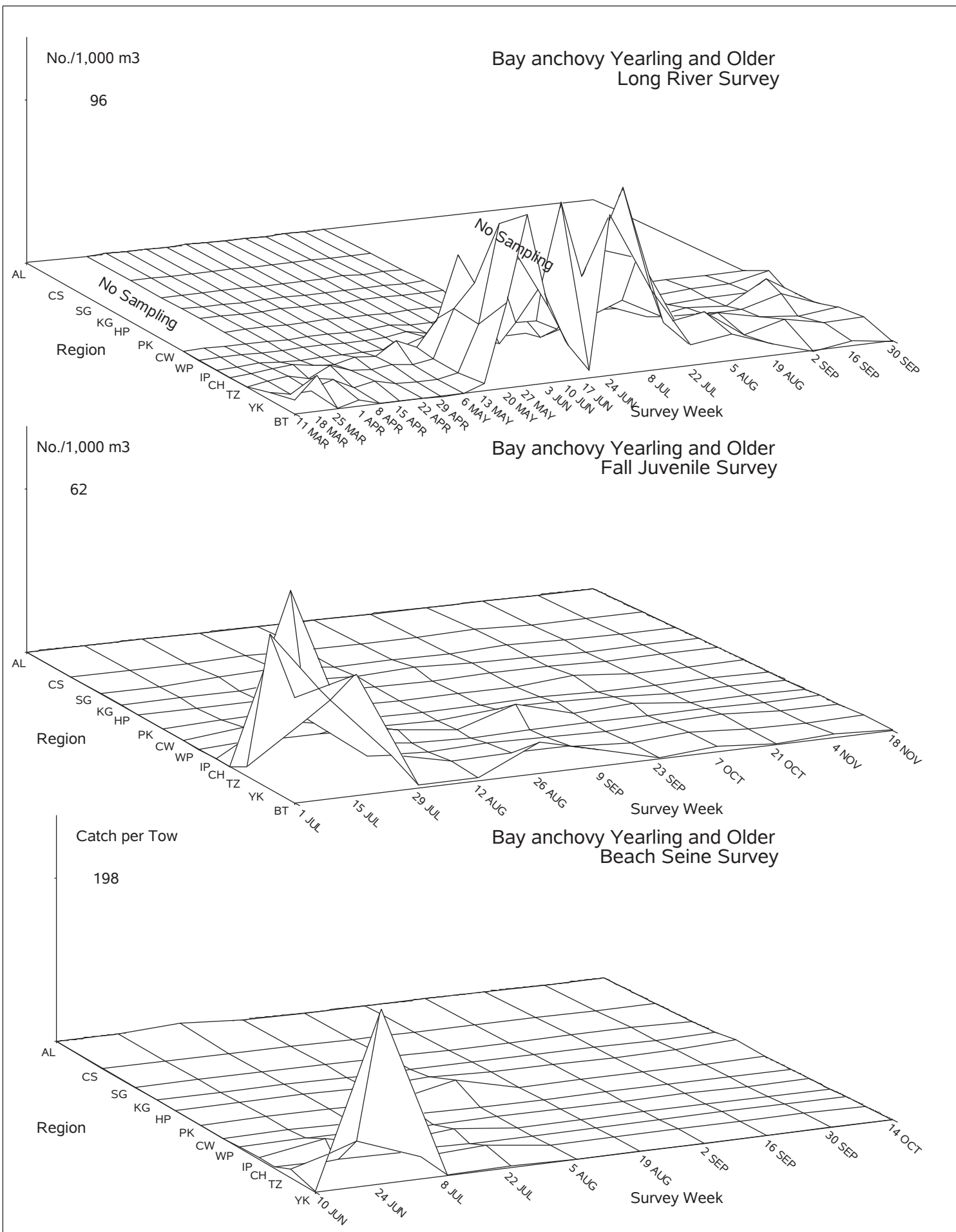


Figure 4-29. Spatiotemporal distribution of yearling and older bay anchovy in the Hudson River estuary based on the 2013 Long River, Fall Juvenile, and Beach Seine surveys.

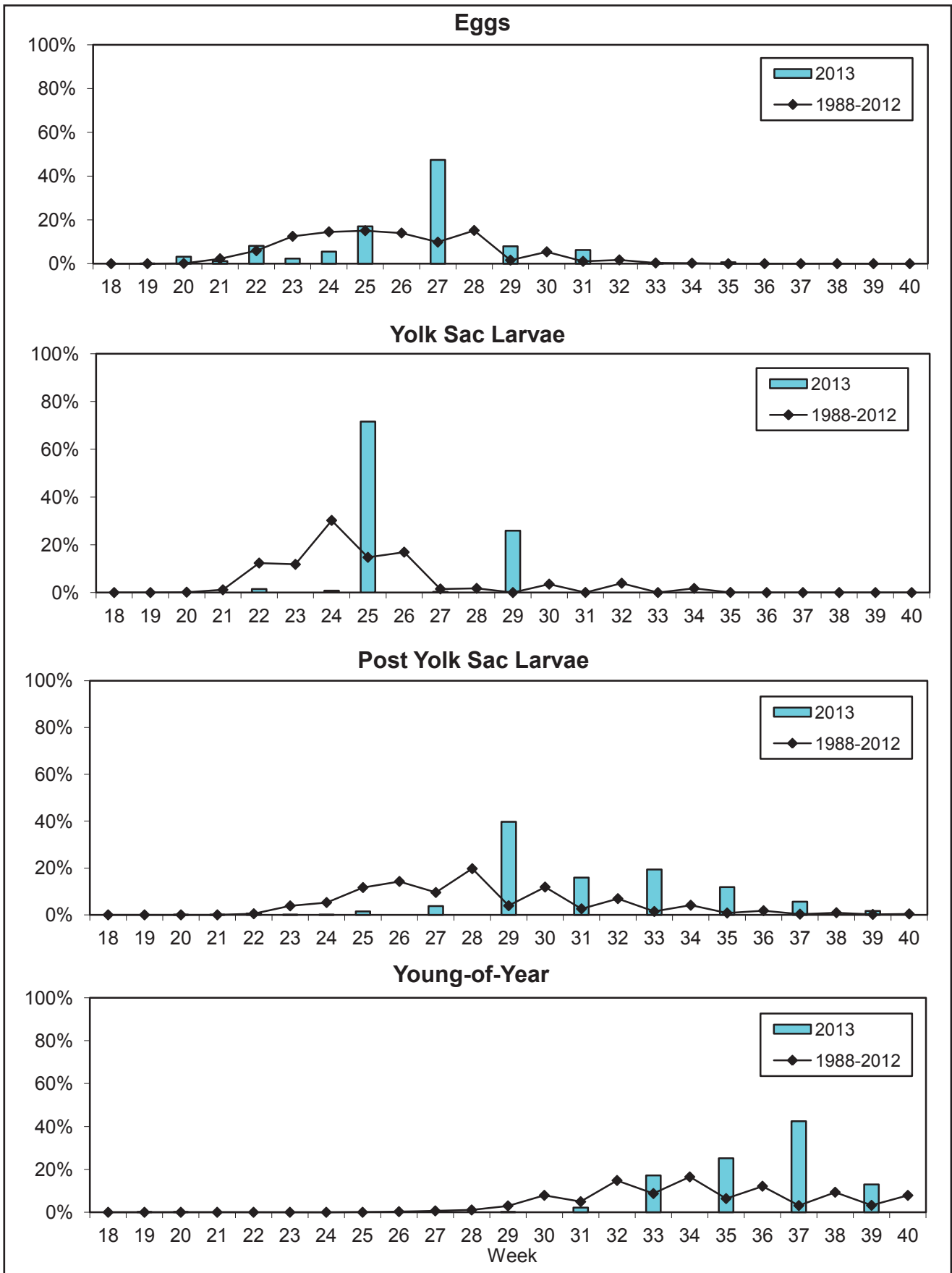


Figure 4-30. Temporal distribution indices for bay anchovy collected during Long River surveys of the Hudson River estuary, 1988-2013.

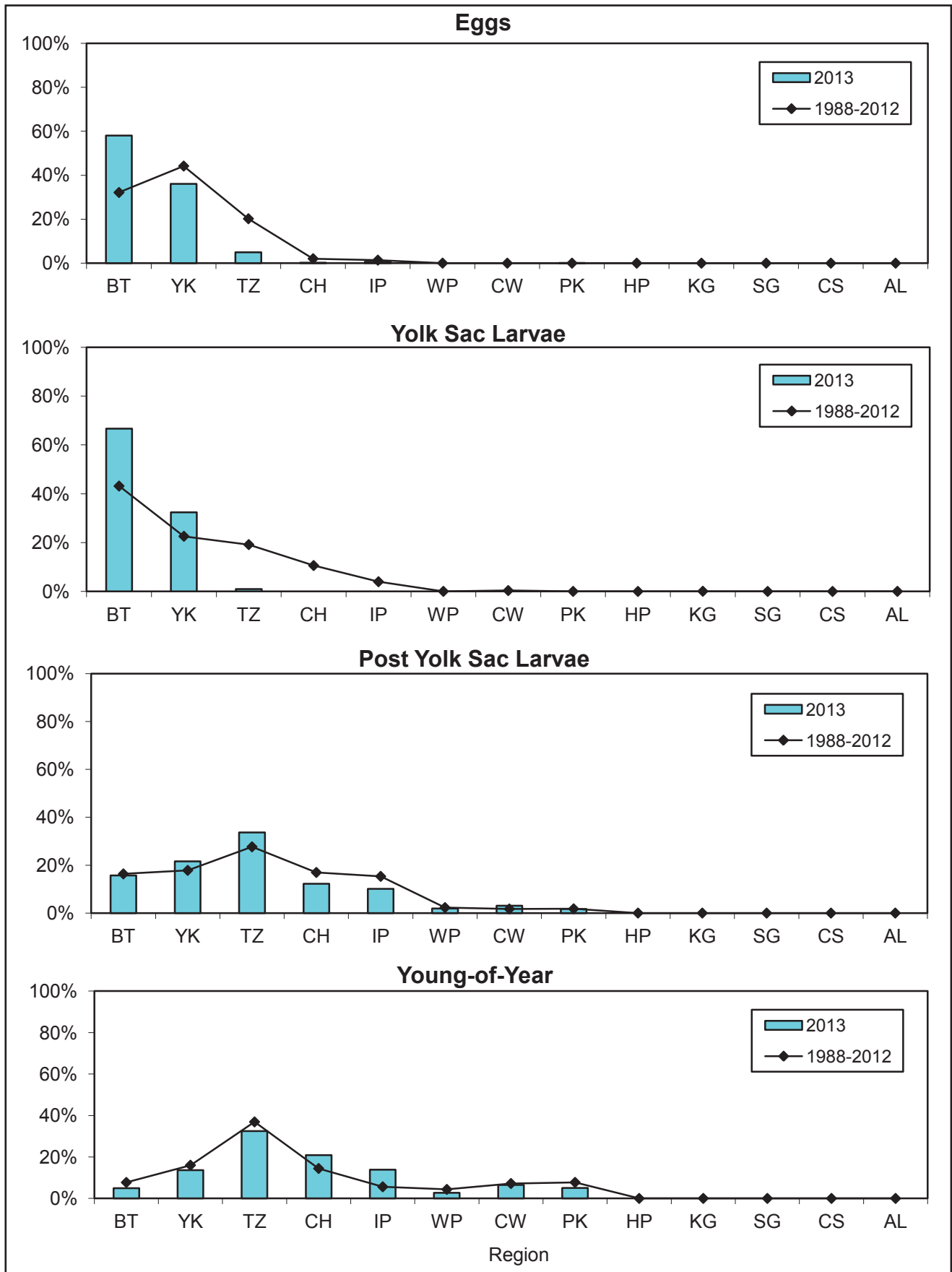


Figure 4-31. Geographic distribution indices for bay anchovy collected during Long River surveys of the Hudson River estuary, 1988-2013.

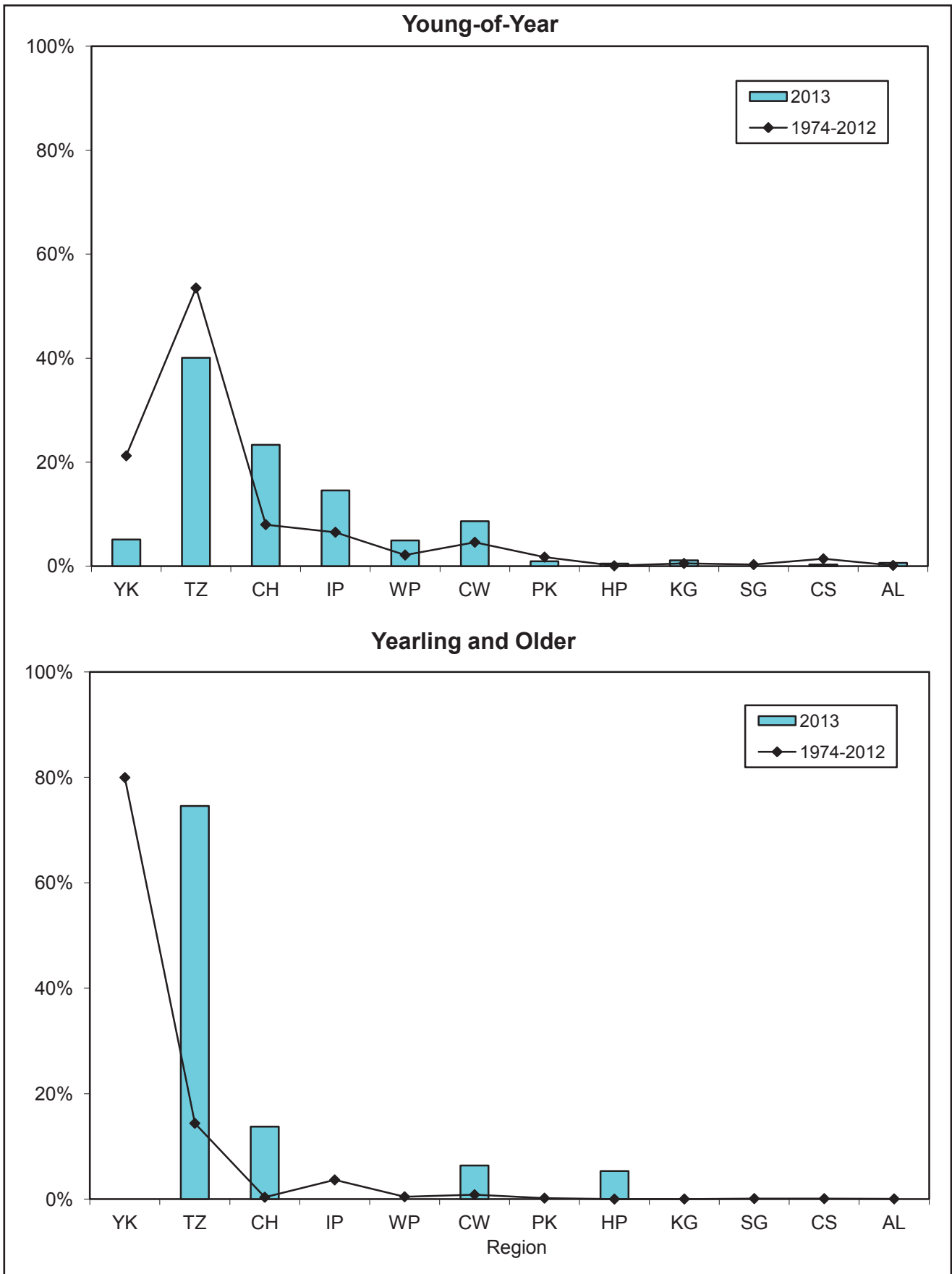


Figure 4-32. Geographic distribution indices for bay anchovy collected during Beach Seine surveys of the Hudson River estuary, 1974-2013.



# Bay anchovy

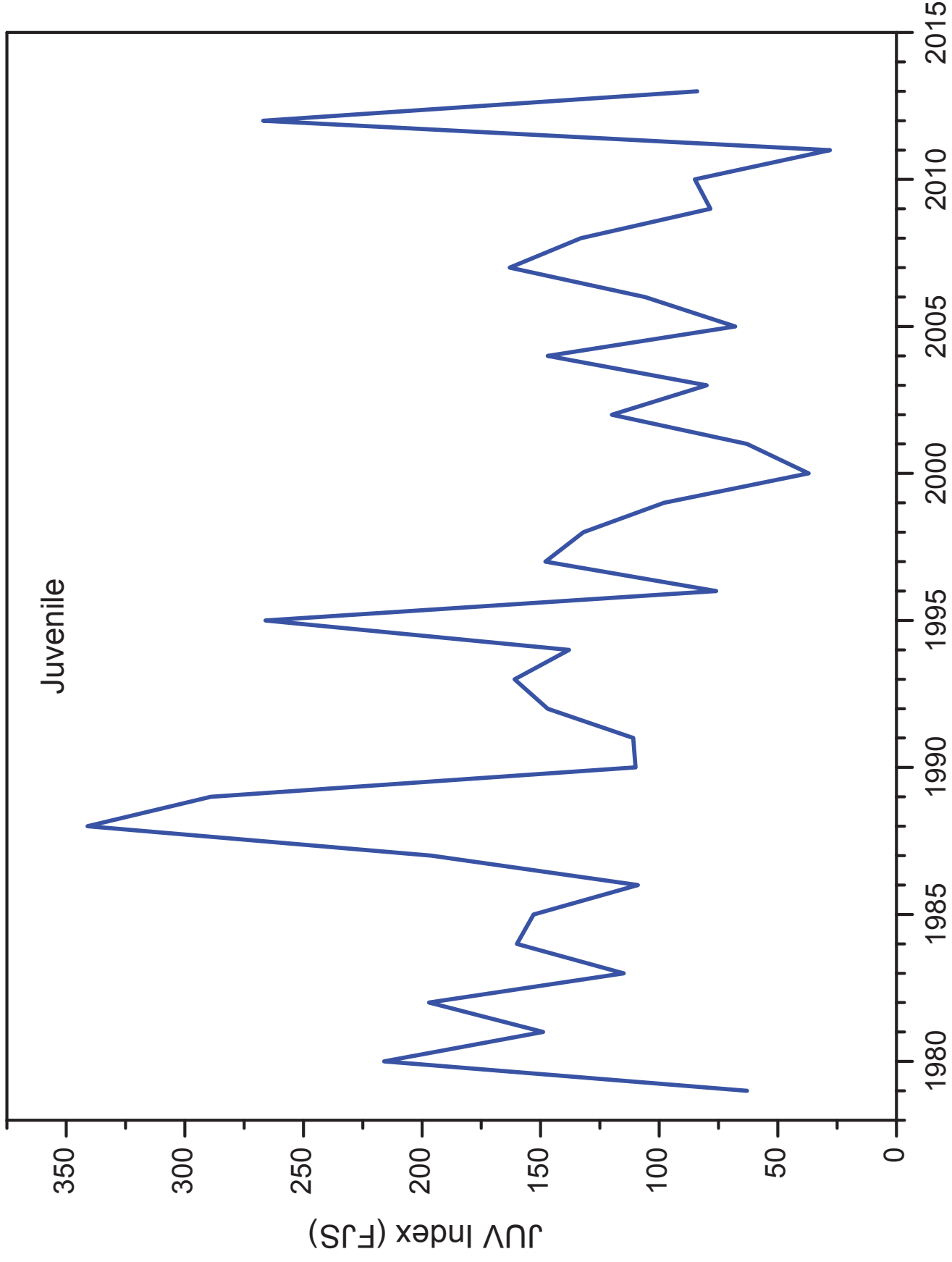


Figure 4-33. Bay anchovy indices of annual abundance based on Fall Juvenile Survey, 1979-2013.

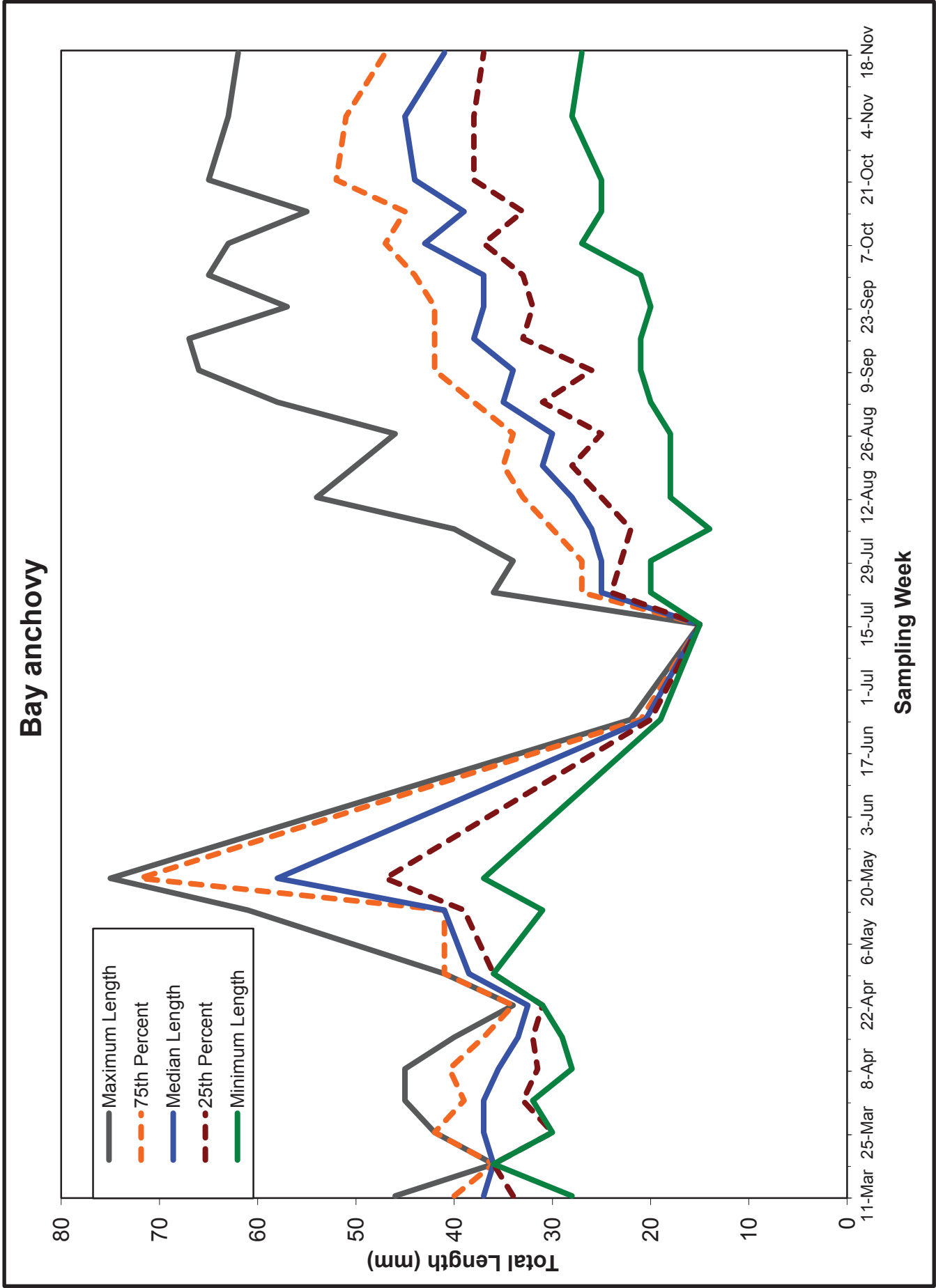


Figure 4-34. Weekly length statistics for young-of-year bay anchovy in the Hudson River estuary, 2013.

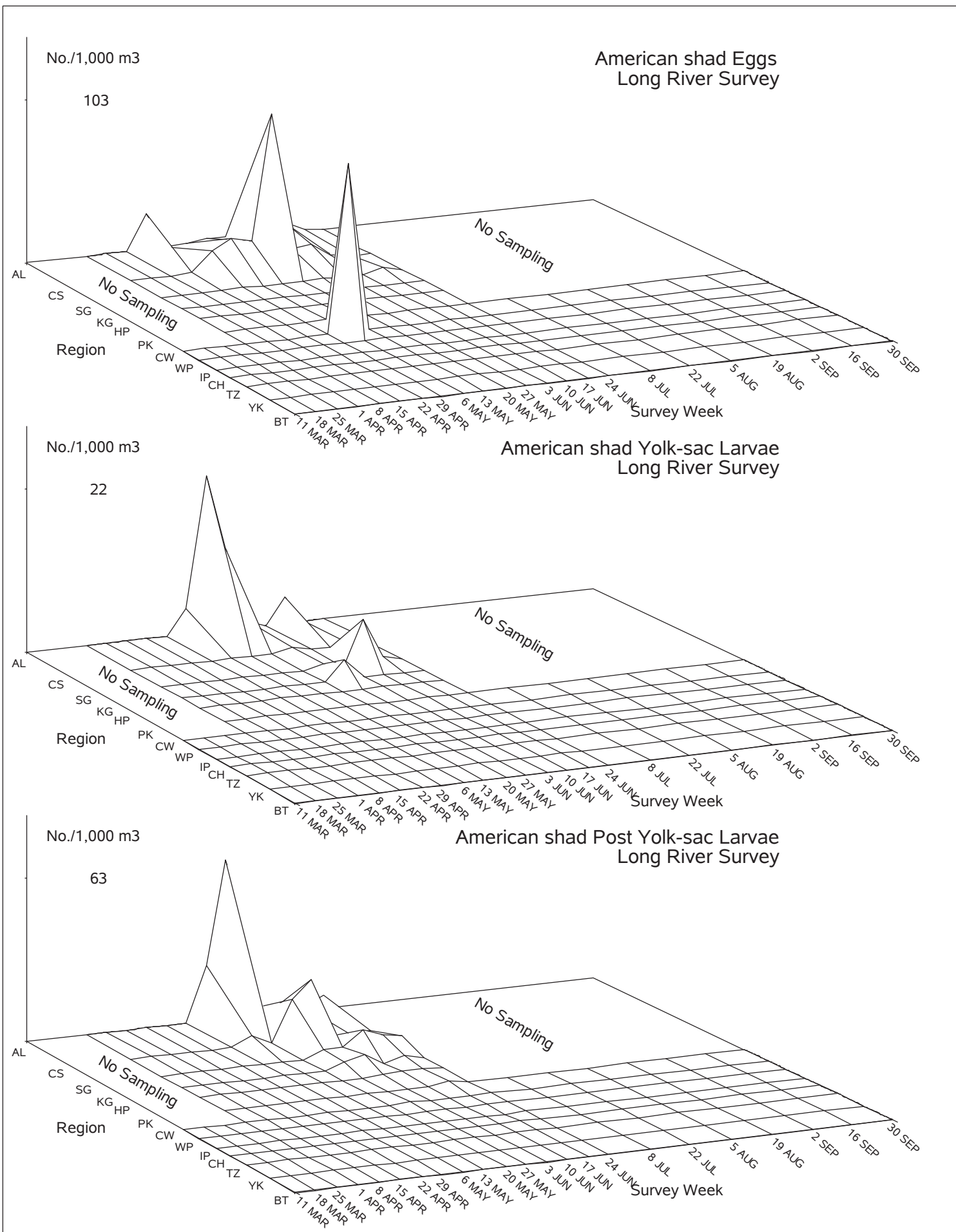


Figure 4-35. Spatiotemporal distribution of eggs, yolk-sac, and post yolk-sac larval American shad in the Hudson River estuary based on the 2013 Long River Survey.

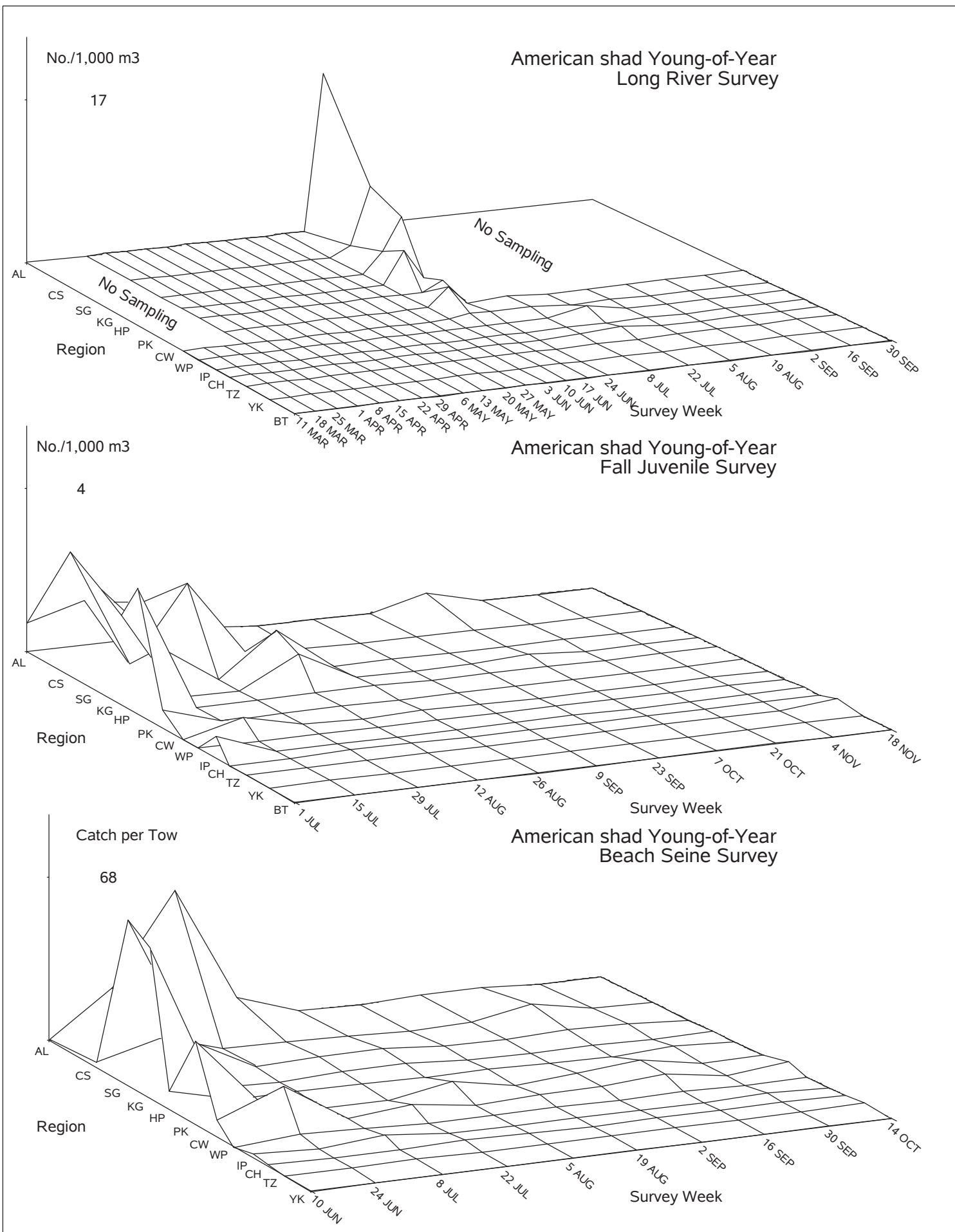


Figure 4-36. Spatiotemporal distribution of young-of-year American shad in the Hudson River estuary based on the 2013 Long River, Fall Juvenile, and Beach Seine surveys.

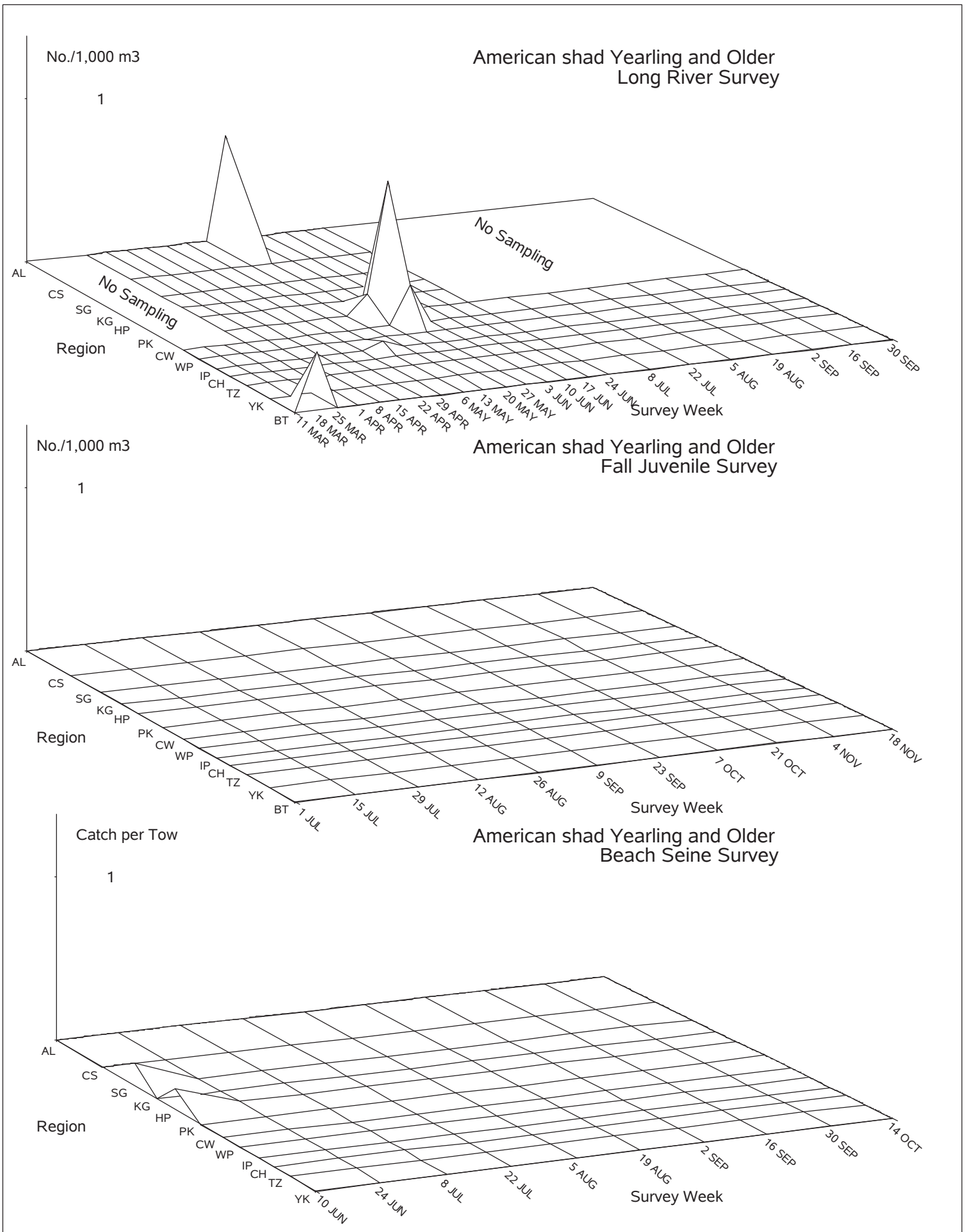


Figure 4-37. Spatiotemporal distribution of yearling and older American shad in the Hudson River estuary based on the 2013 Long River, Fall Juvenile, and Beach Seine surveys.

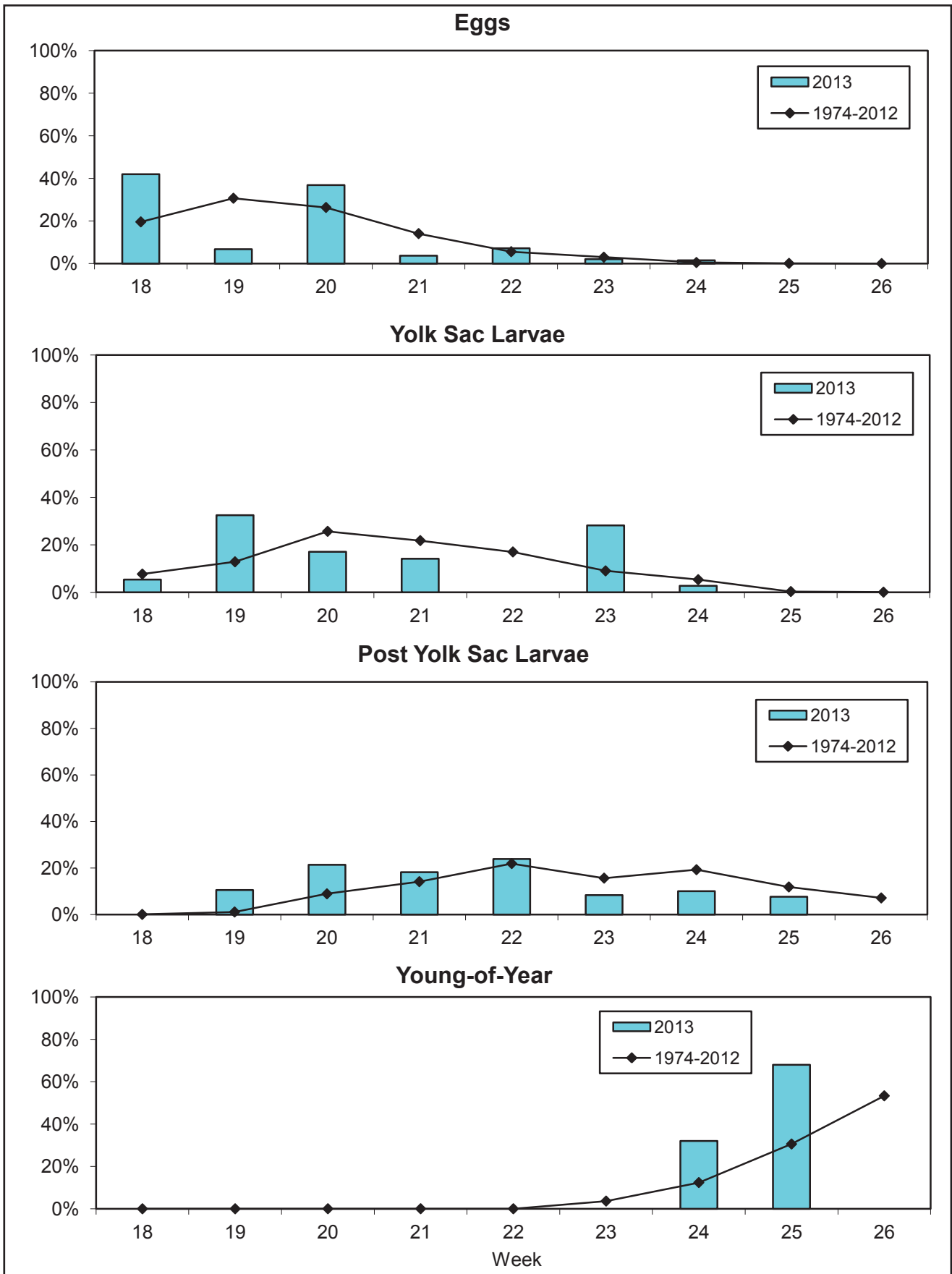


Figure 4-38. Temporal distribution indices for American shad collected during Long River surveys of the Hudson River estuary, 1974-2013.

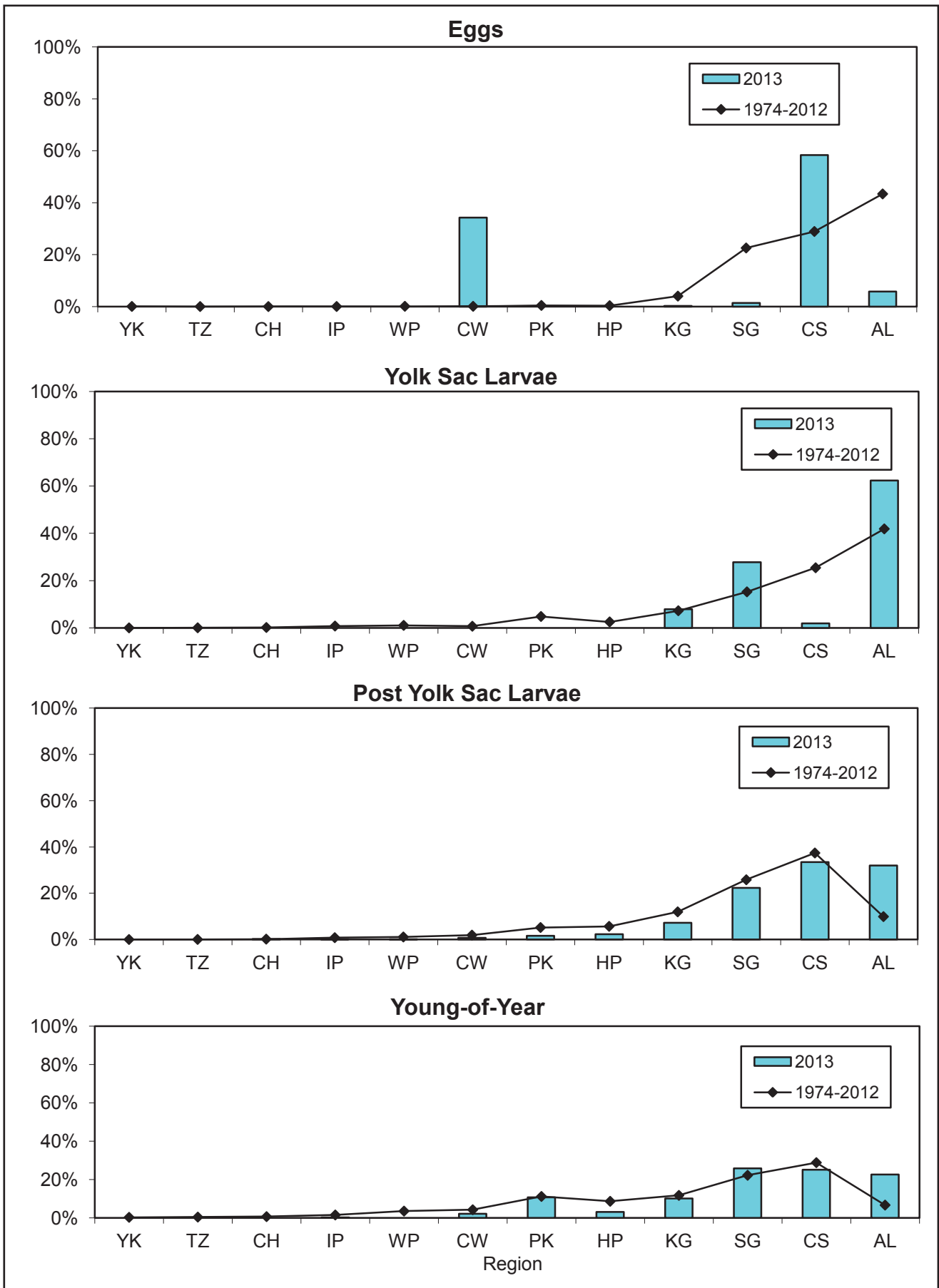


Figure 4-39. Geographic distribution indices for American shad collected during Long River surveys of the Hudson River estuary, 1974-2013.

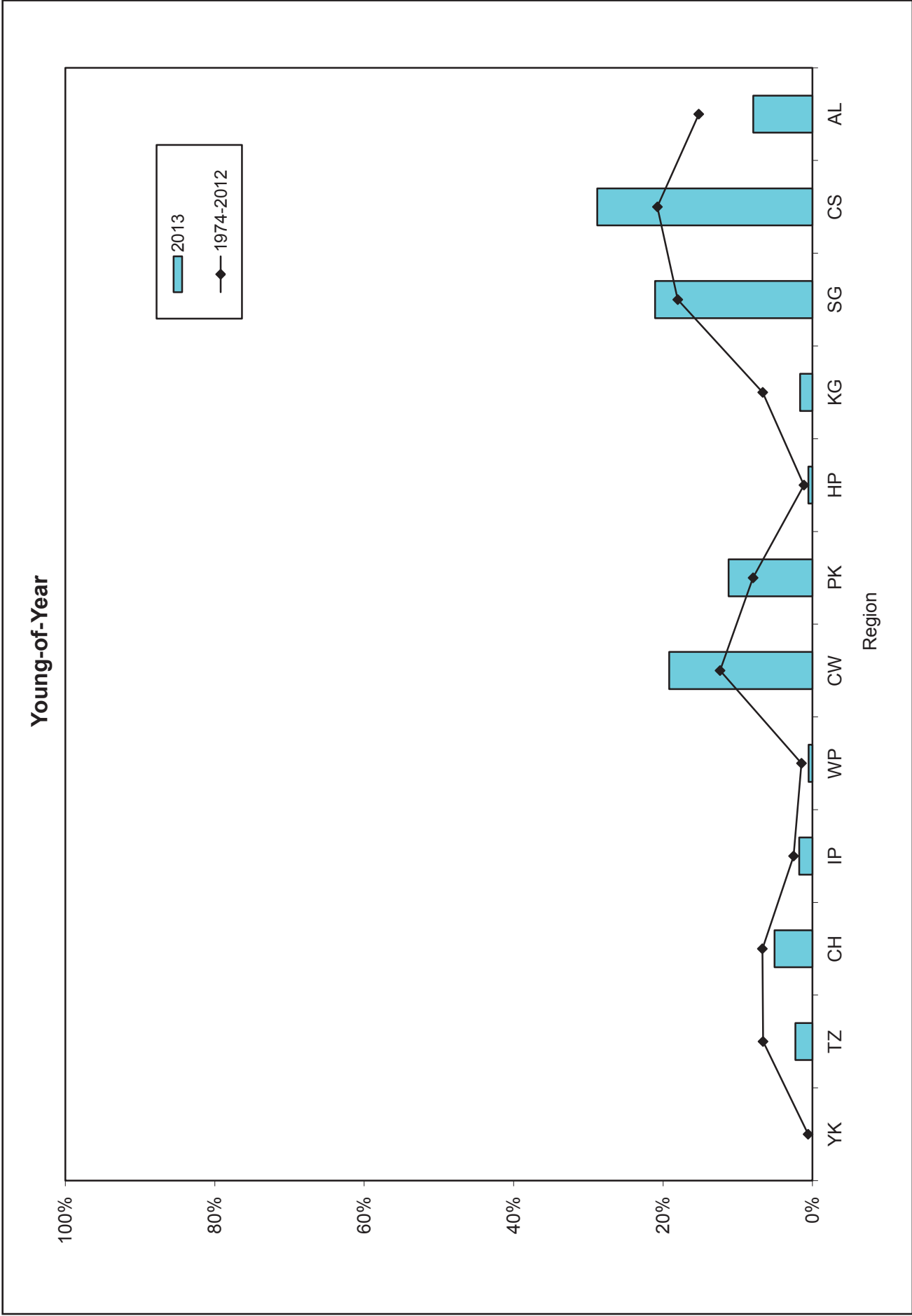


Figure 4-40. Geographic distribution indices for American shad collected during Beach Seine surveys of the Hudson River estuary, 1974-2013.



# American shad

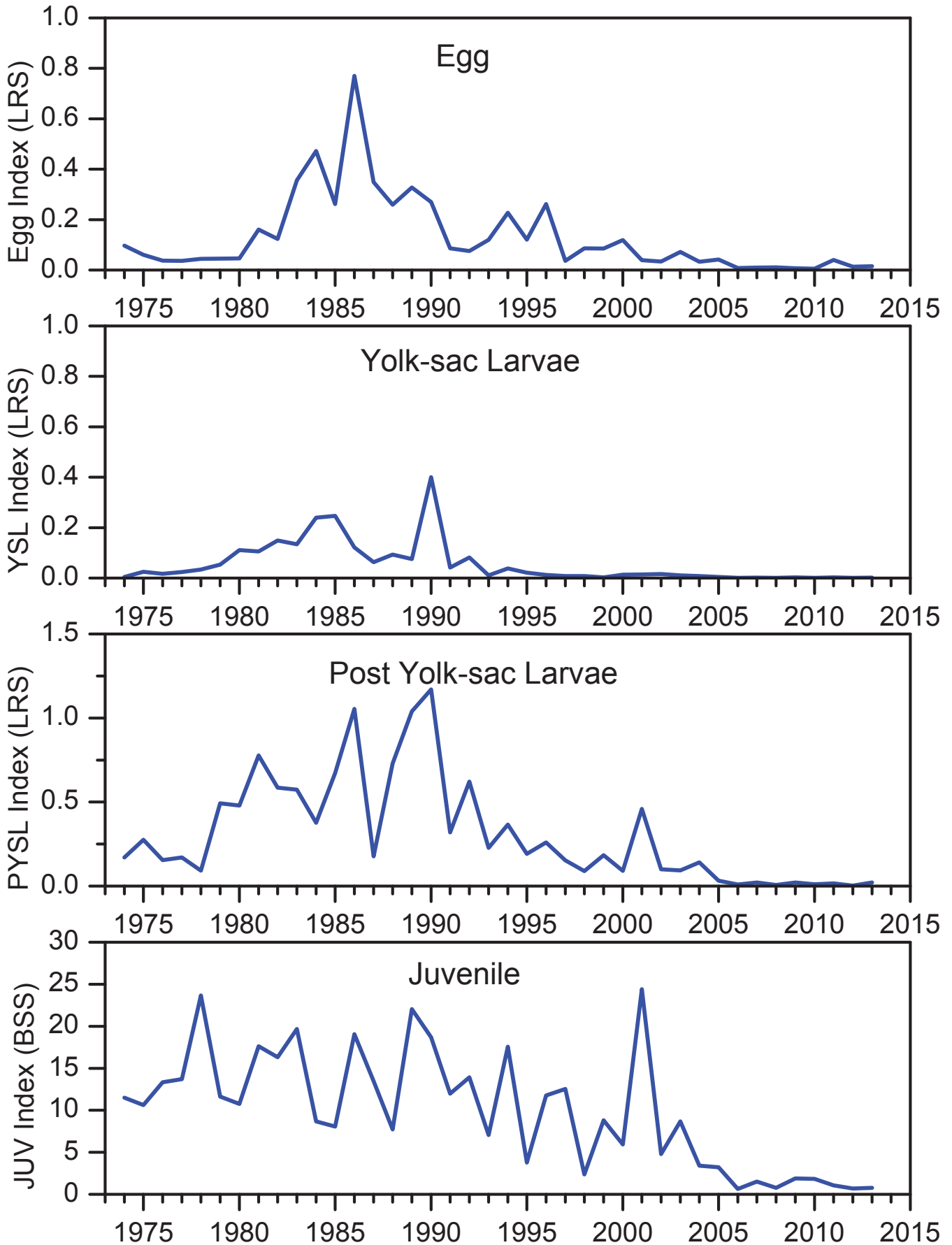


Figure 4-41. American shad indices of annual abundance based on Long River Survey and Beach Seine Survey, 1974-2013.

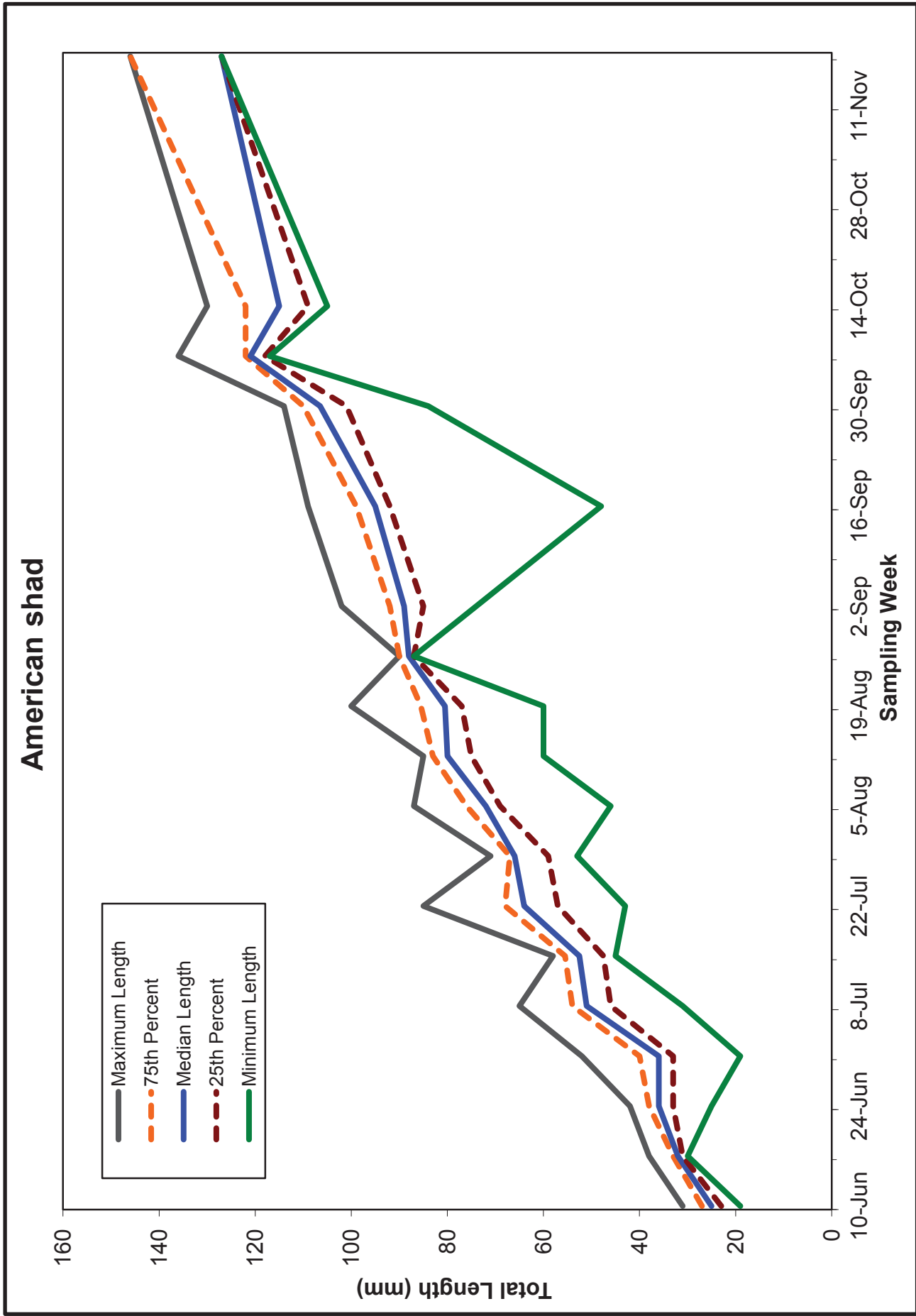


Figure 4-42. Weekly length statistics for young-of-year American shad in the Hudson River estuary, 2013.

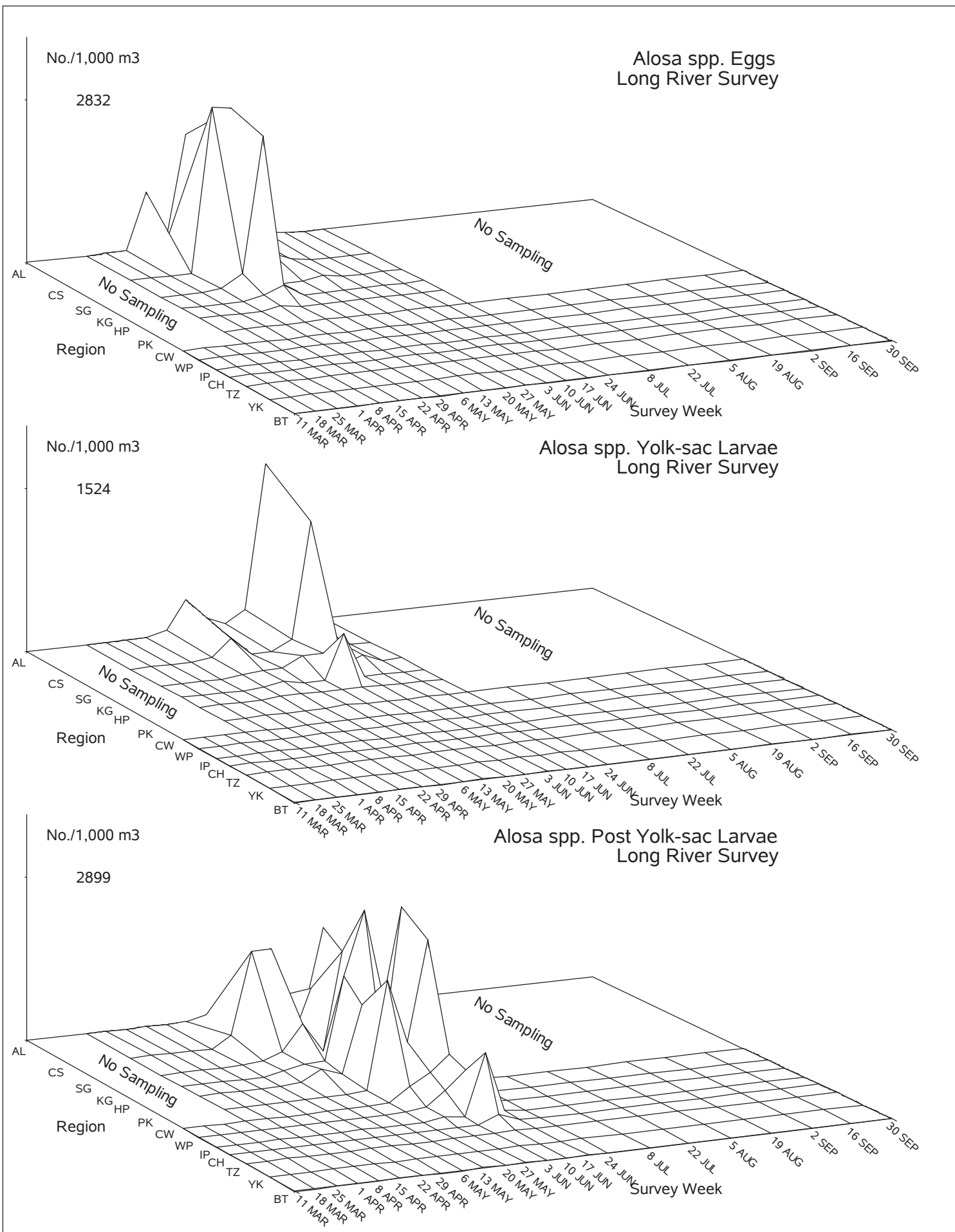


Figure 4-43. Spatiotemporal distribution of eggs, yolk-sac, and post yolk-sac larval *Alosa* spp. in the Hudson River estuary based on the 2013 Long River Survey.

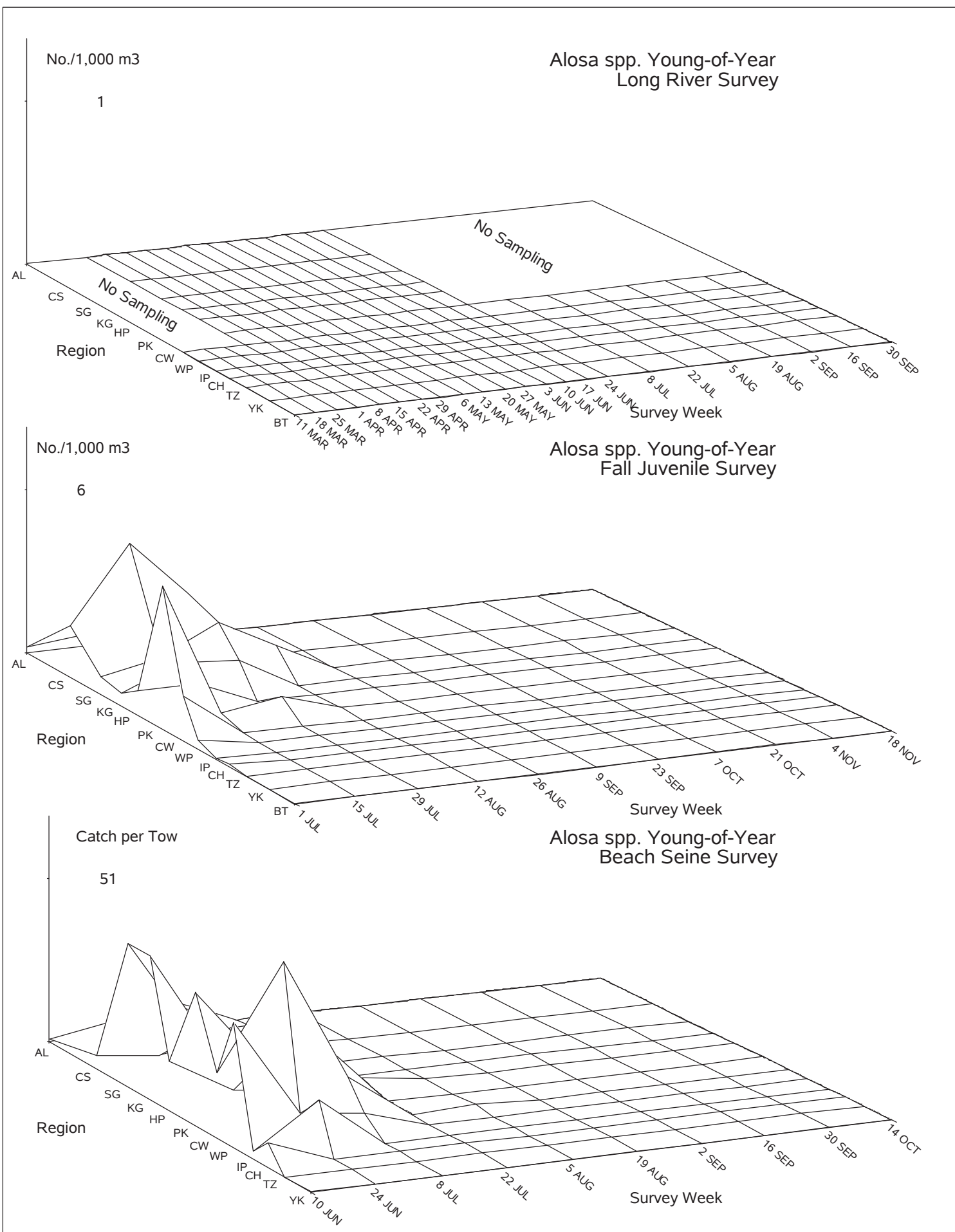


Figure 4-44. Spatiotemporal distribution of young-of-year *Alosa* spp. in the Hudson River estuary based on the 2013 Long River, Fall Juvenile, and Beach Seine surveys.

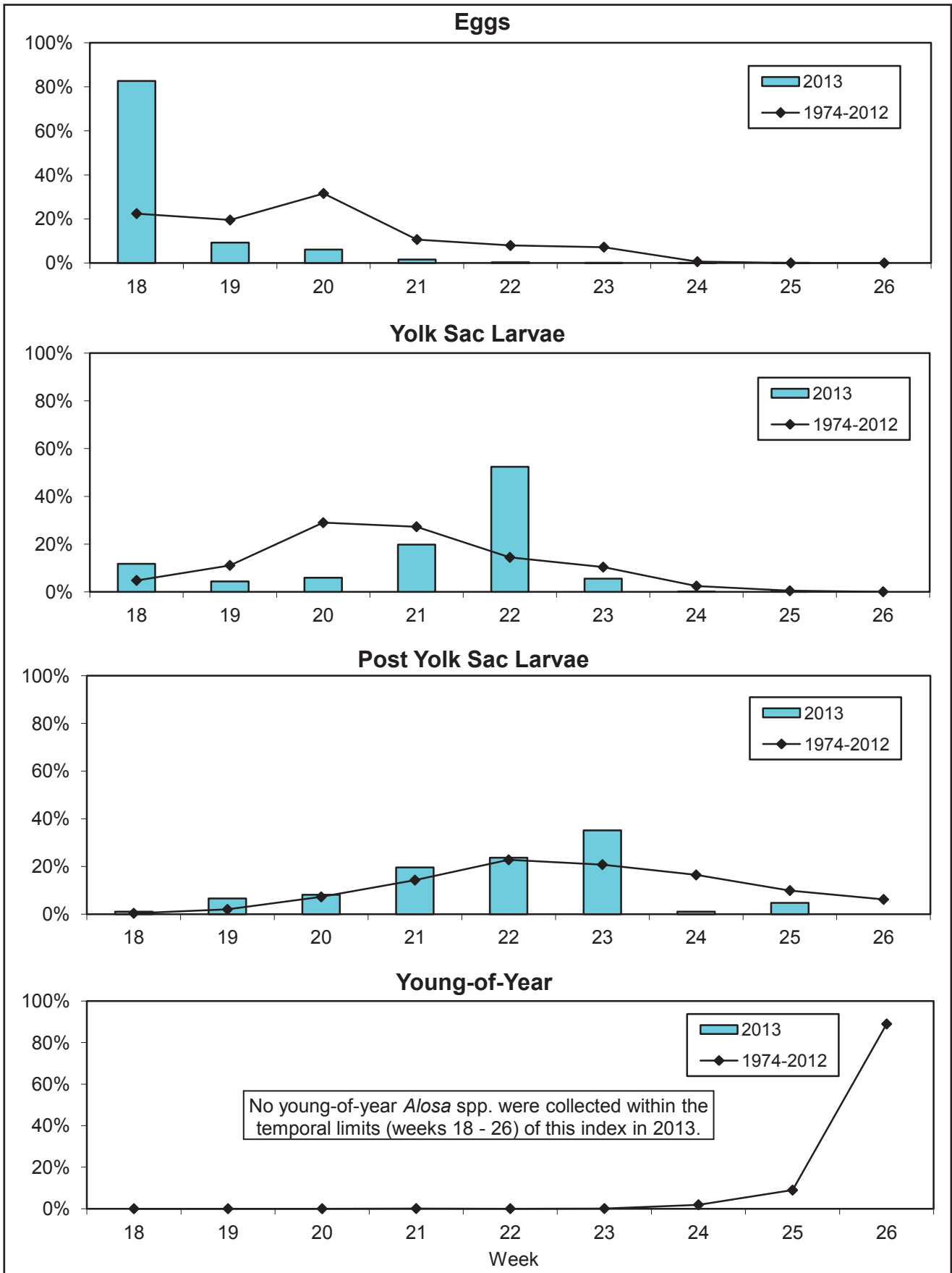


Figure 4-45. Temporal distribution indices for *Alosa* spp. collected during Long River surveys of the Hudson River estuary, 1974-2013.

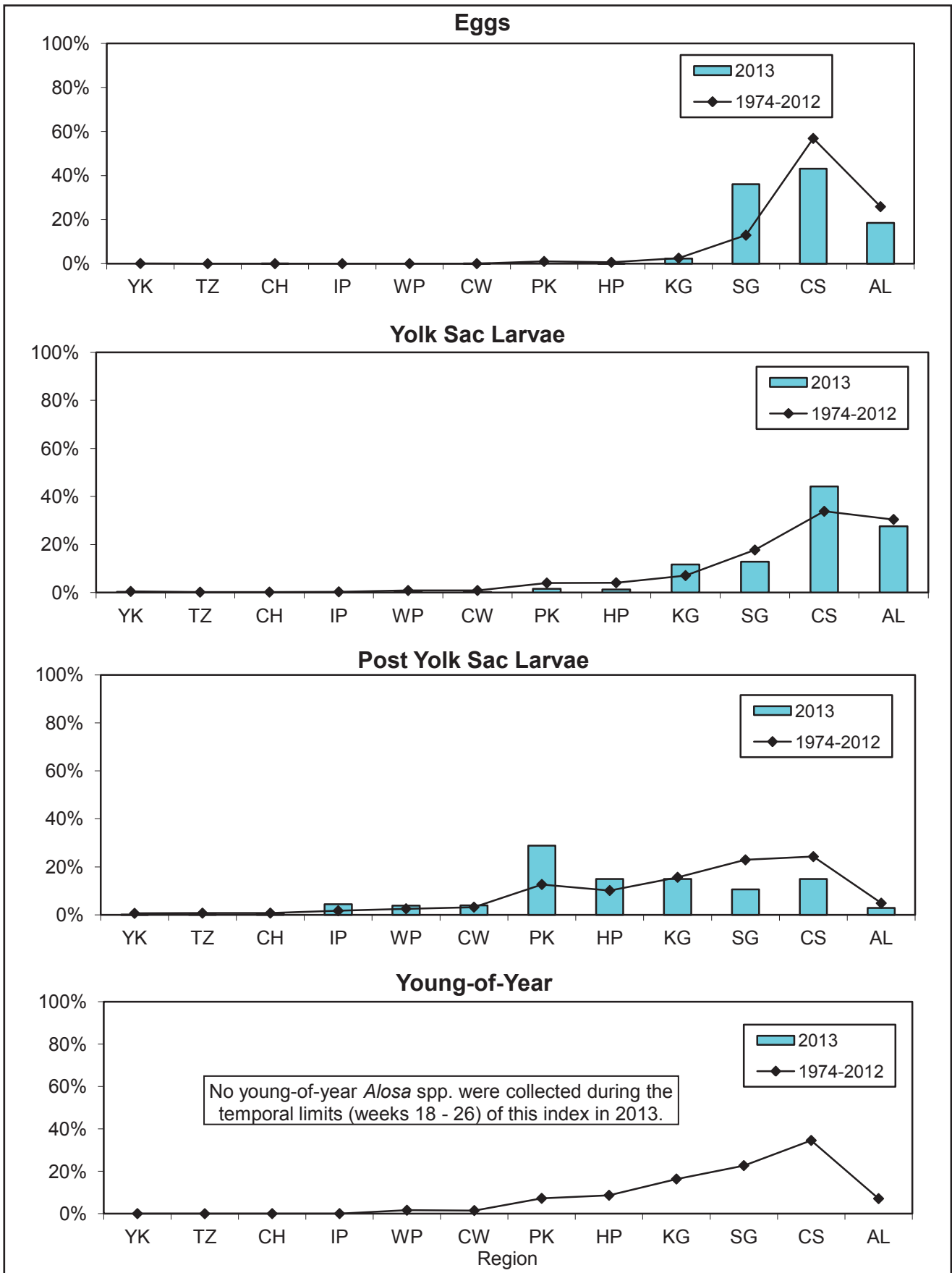


Figure 4-46. Geographic distribution indices for *Alosa* spp. collected during Long River surveys of the Hudson River estuary, 1974-2013.

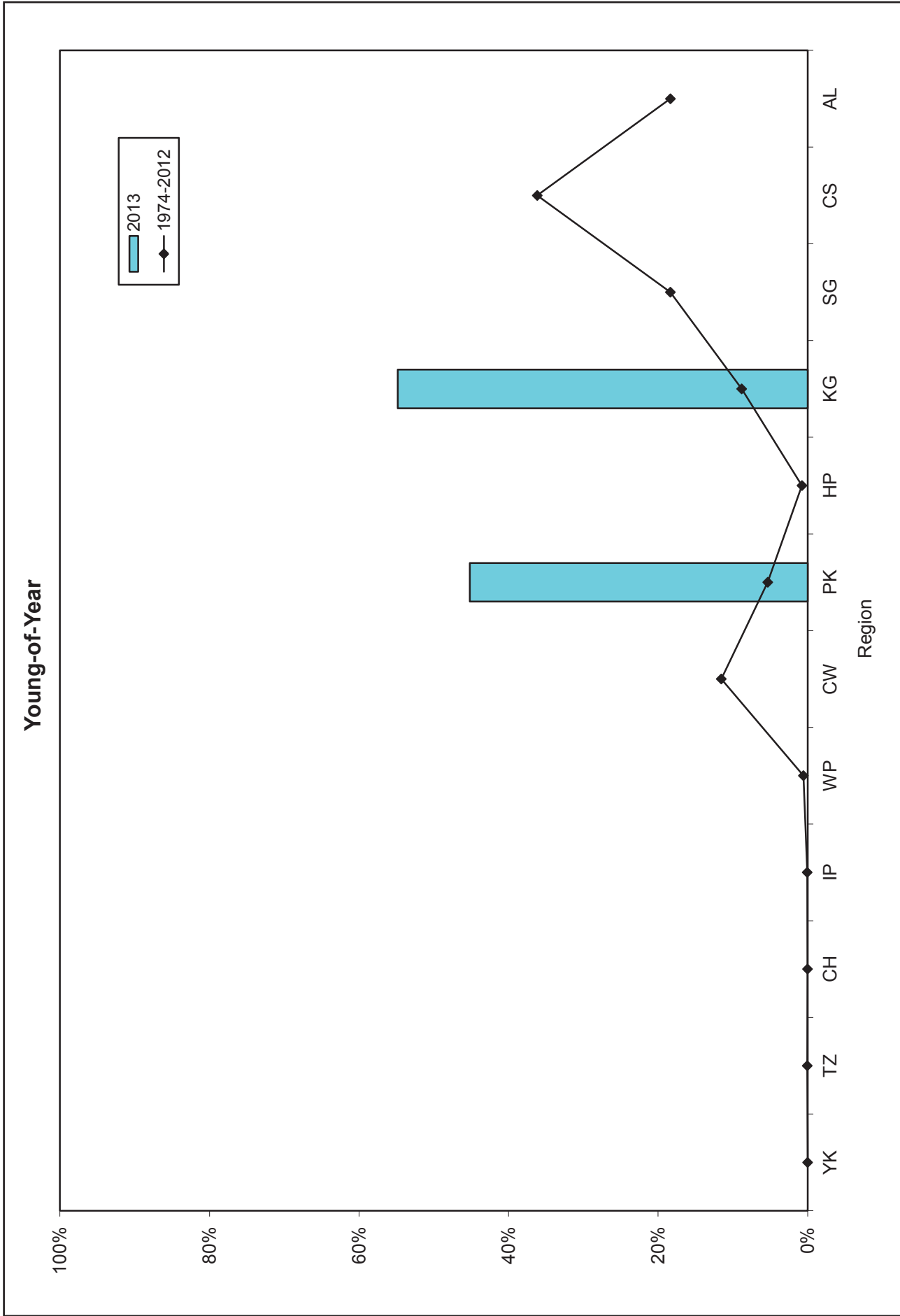


Figure 4-47. Geographic distribution indices for *Alosa* spp. collected during Beach Seine surveys of the Hudson River estuary, 1974-2013.

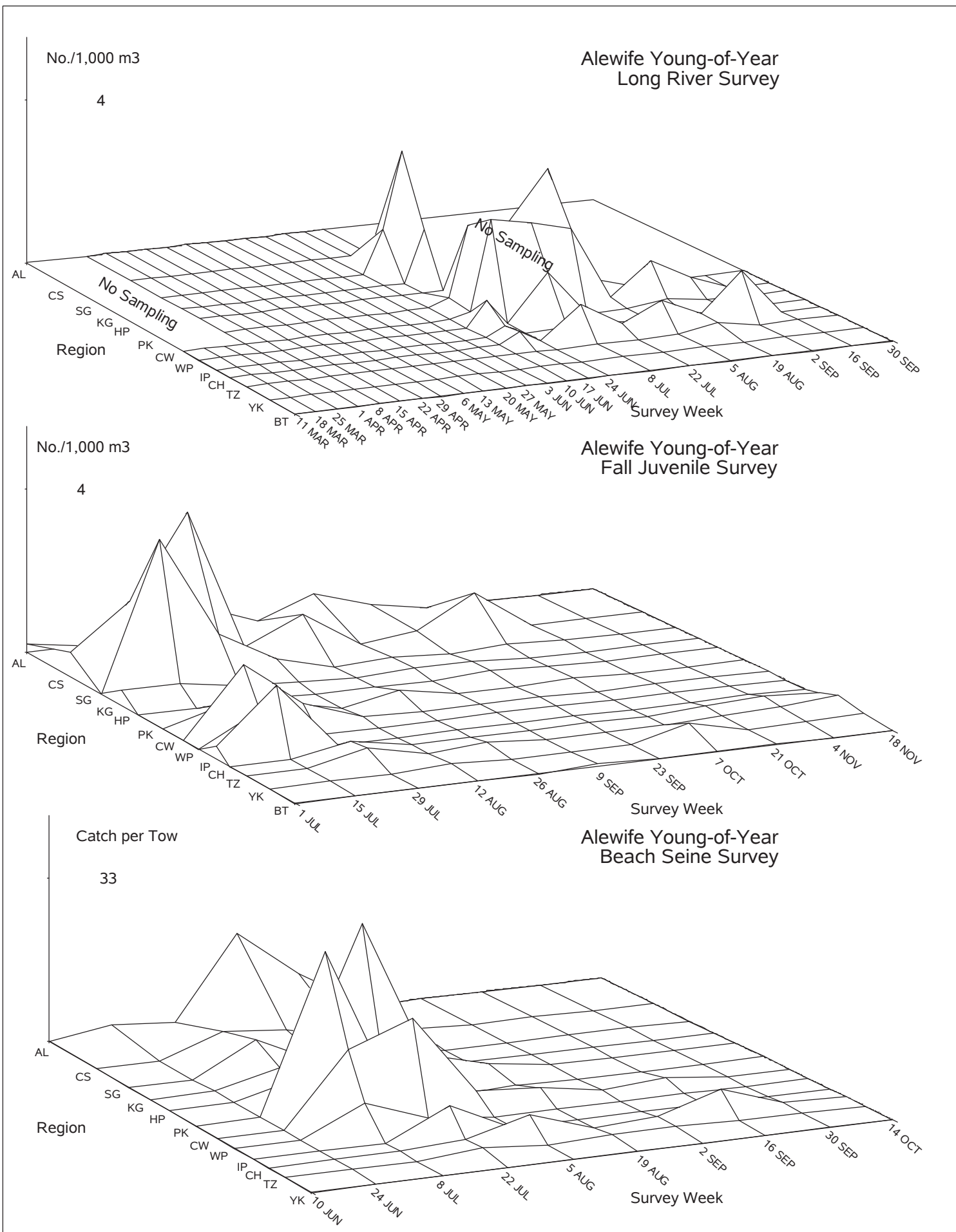


Figure 4-48. Spatiotemporal distribution of young-of-year alewife in the Hudson River estuary based on the 2013 Long River, Fall Juvenile, and Beach Seine surveys.



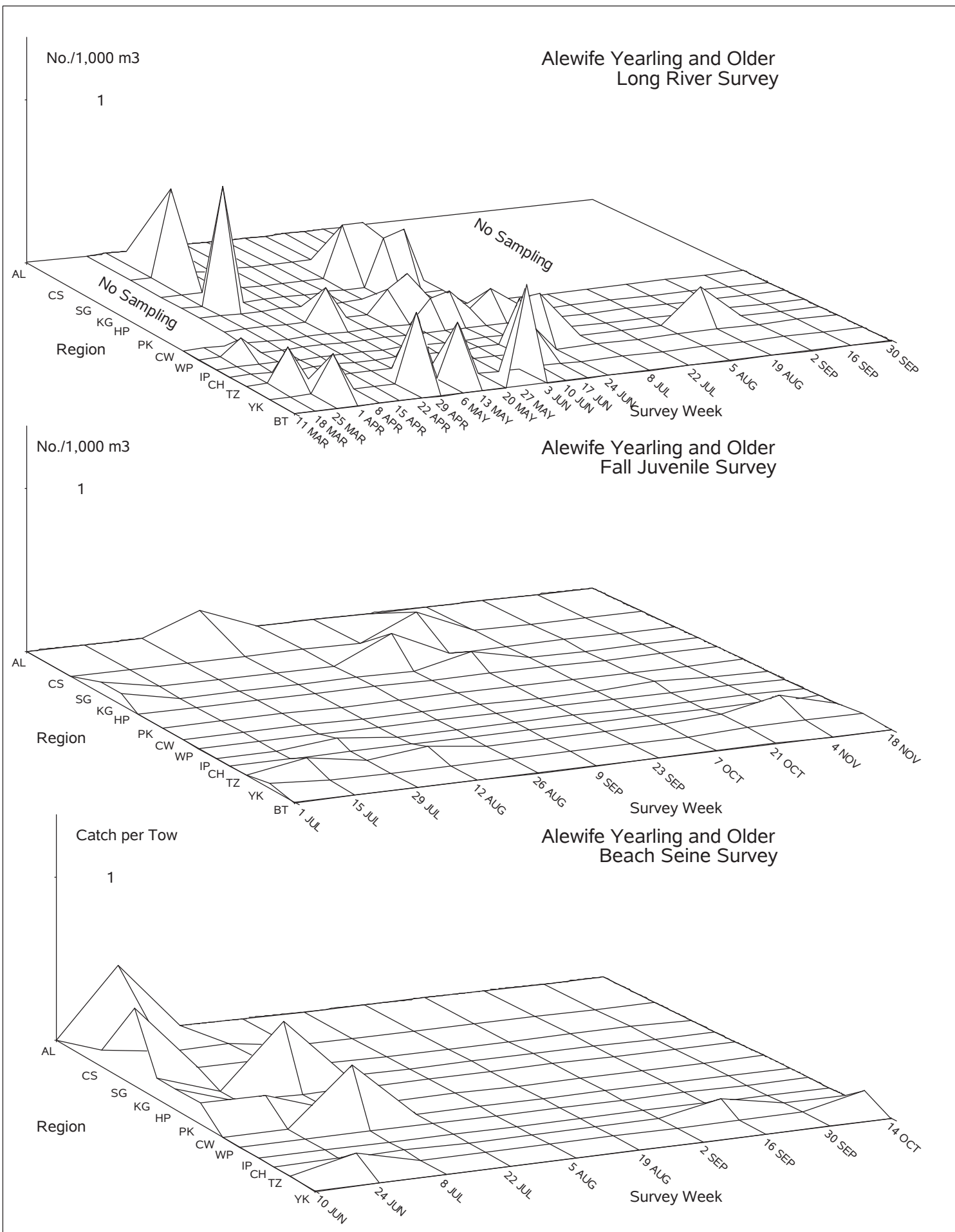


Figure 4-49. Spatiotemporal distribution of yearling and older alewife in the Hudson River estuary based on the 2013 Long River, Fall Juvenile, and Beach Seine surveys.

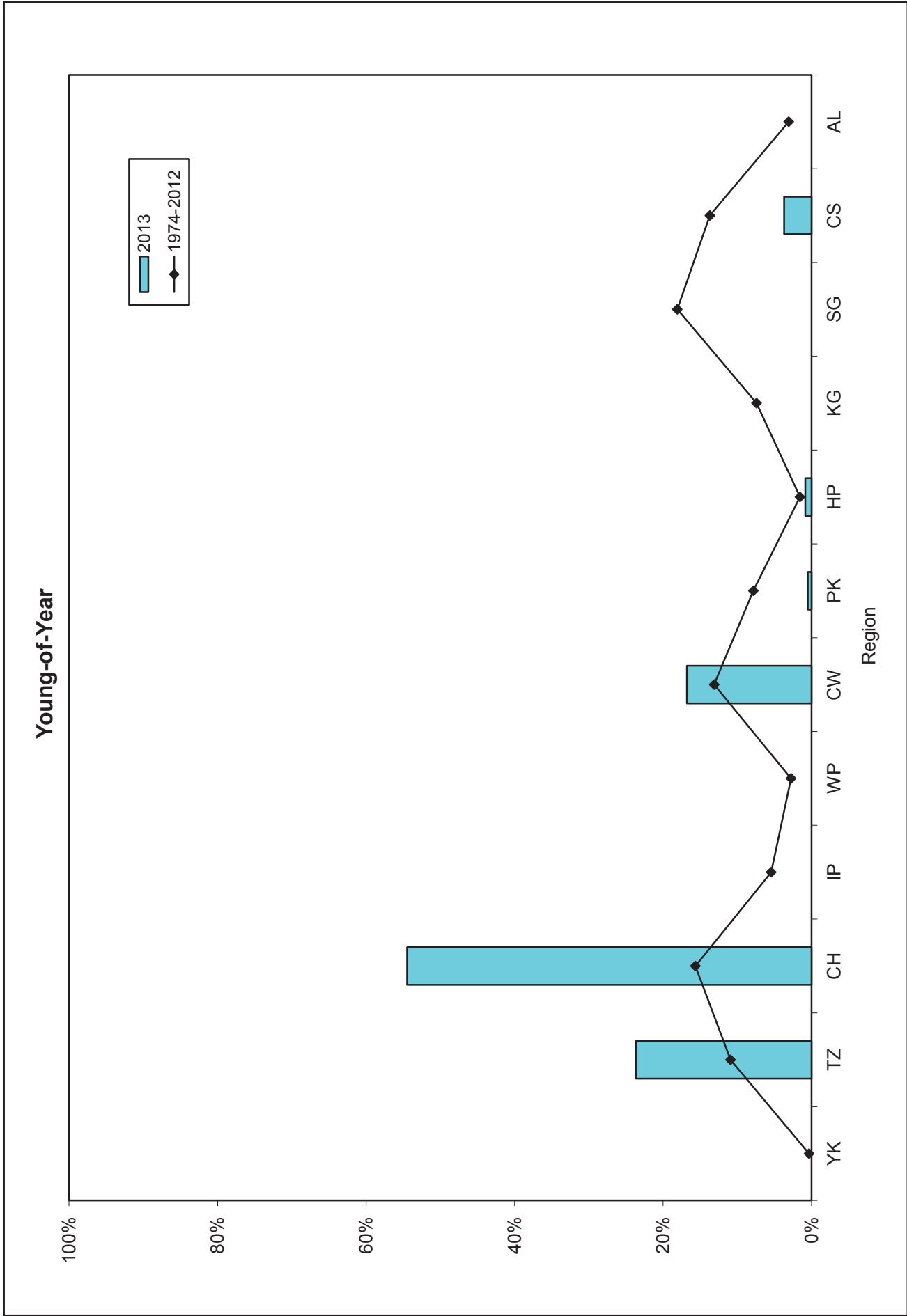


Figure 4-50. Geographic distribution indices for alewife collected during Beach Seine surveys of the Hudson River estuary, 1974-2013.

# Alewife

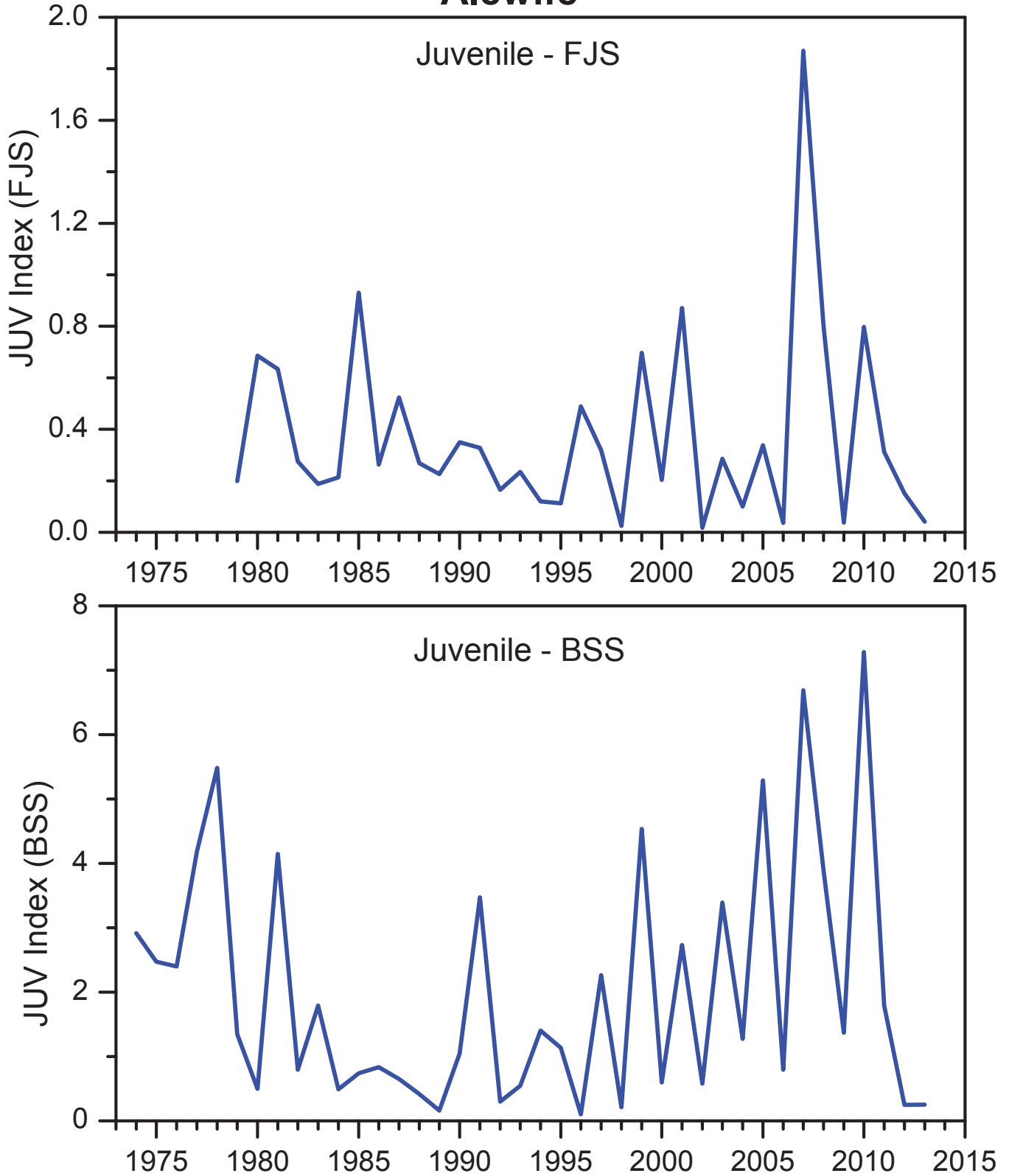


Figure 4-51. Alewife indices of annual abundance based on Fall Juvenile Survey, 1979-2013, and Beach Seine Survey, 1974-2013.

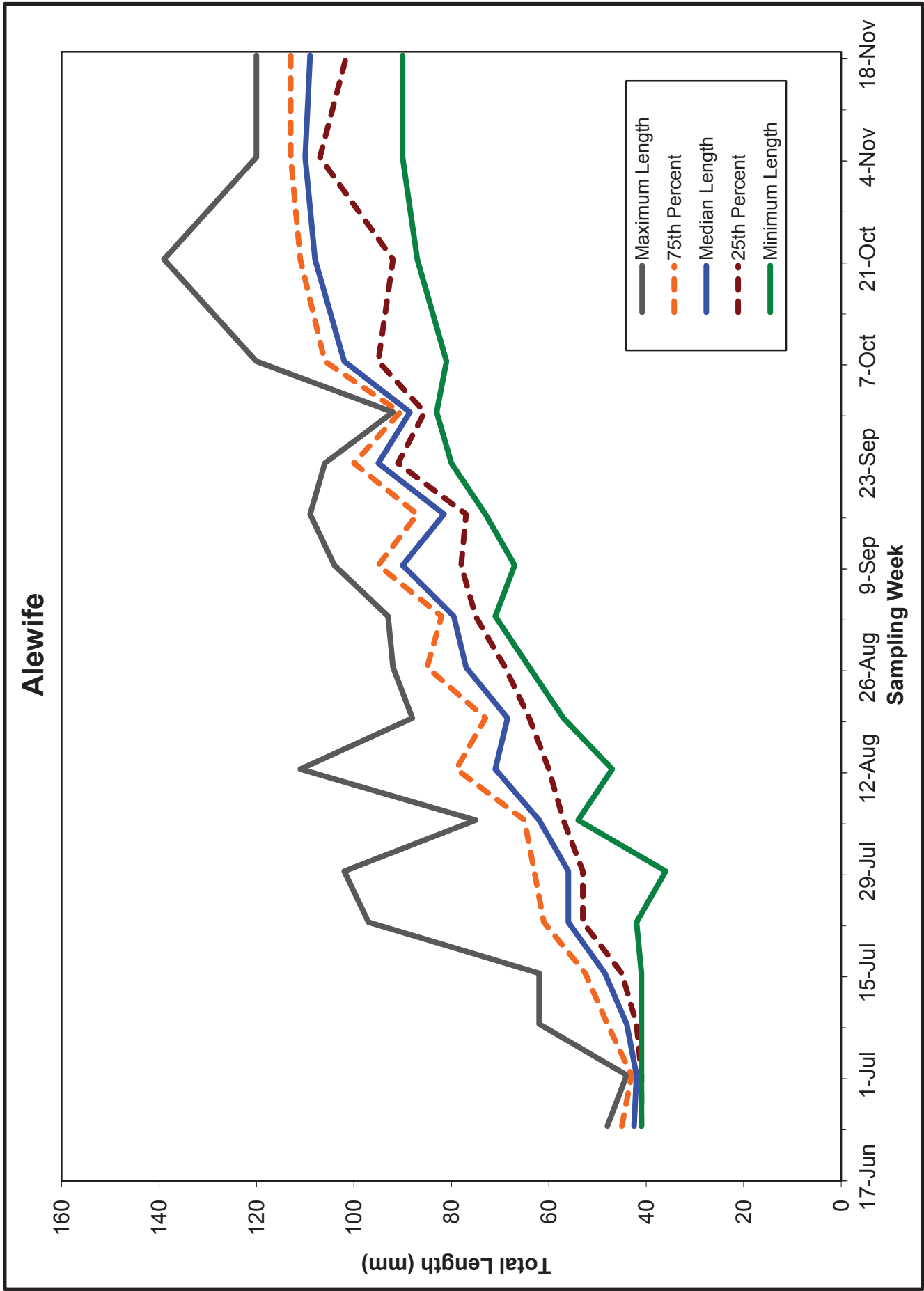


Figure 4-52. Weekly length statistics for young-of-year alewife in the Hudson River estuary, 2013.

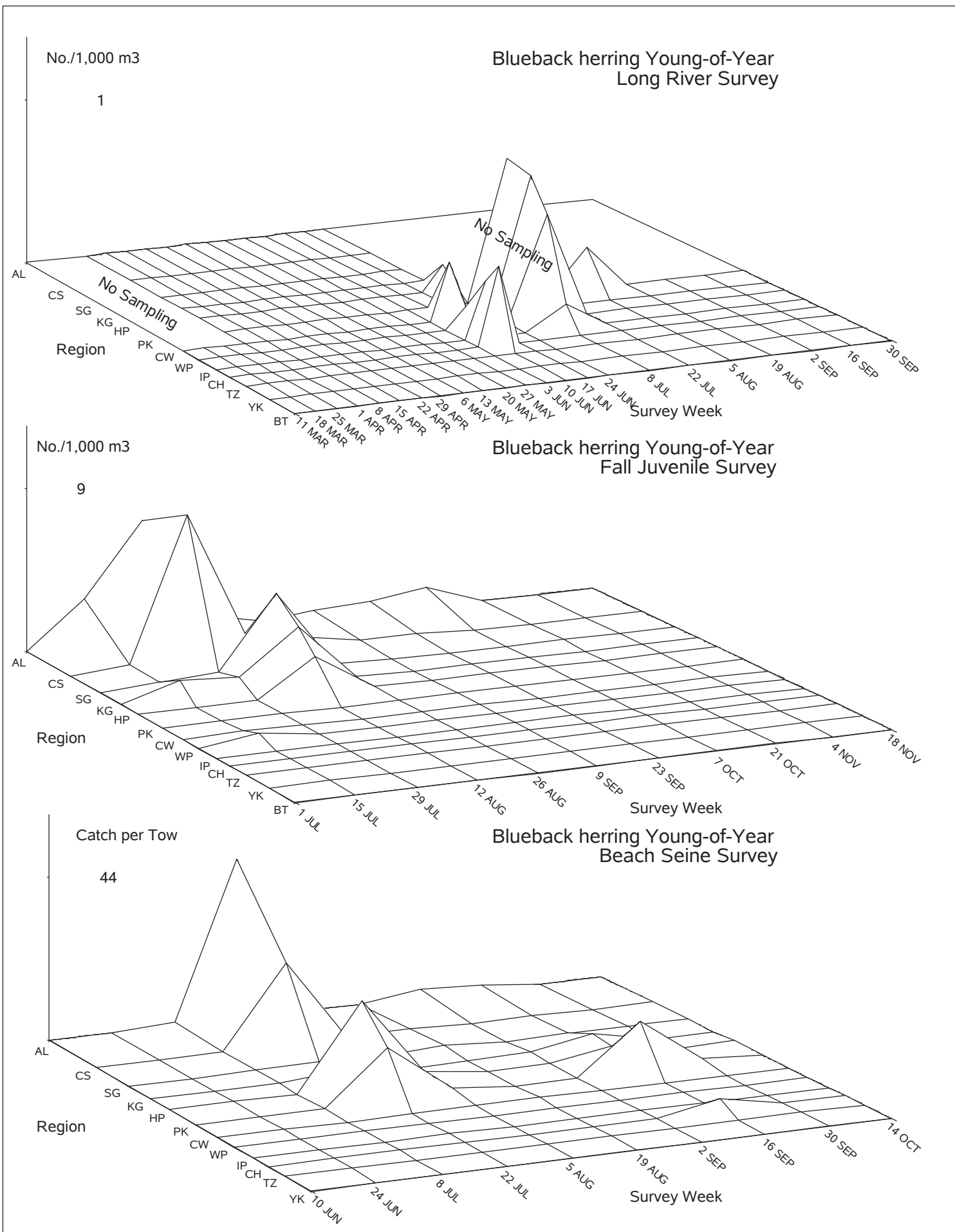


Figure 4-53. Spatiotemporal distribution of young-of-year blueback herring in the Hudson River estuary based on the 2013 Long River, Fall Juvenile, and Beach Seine surveys.

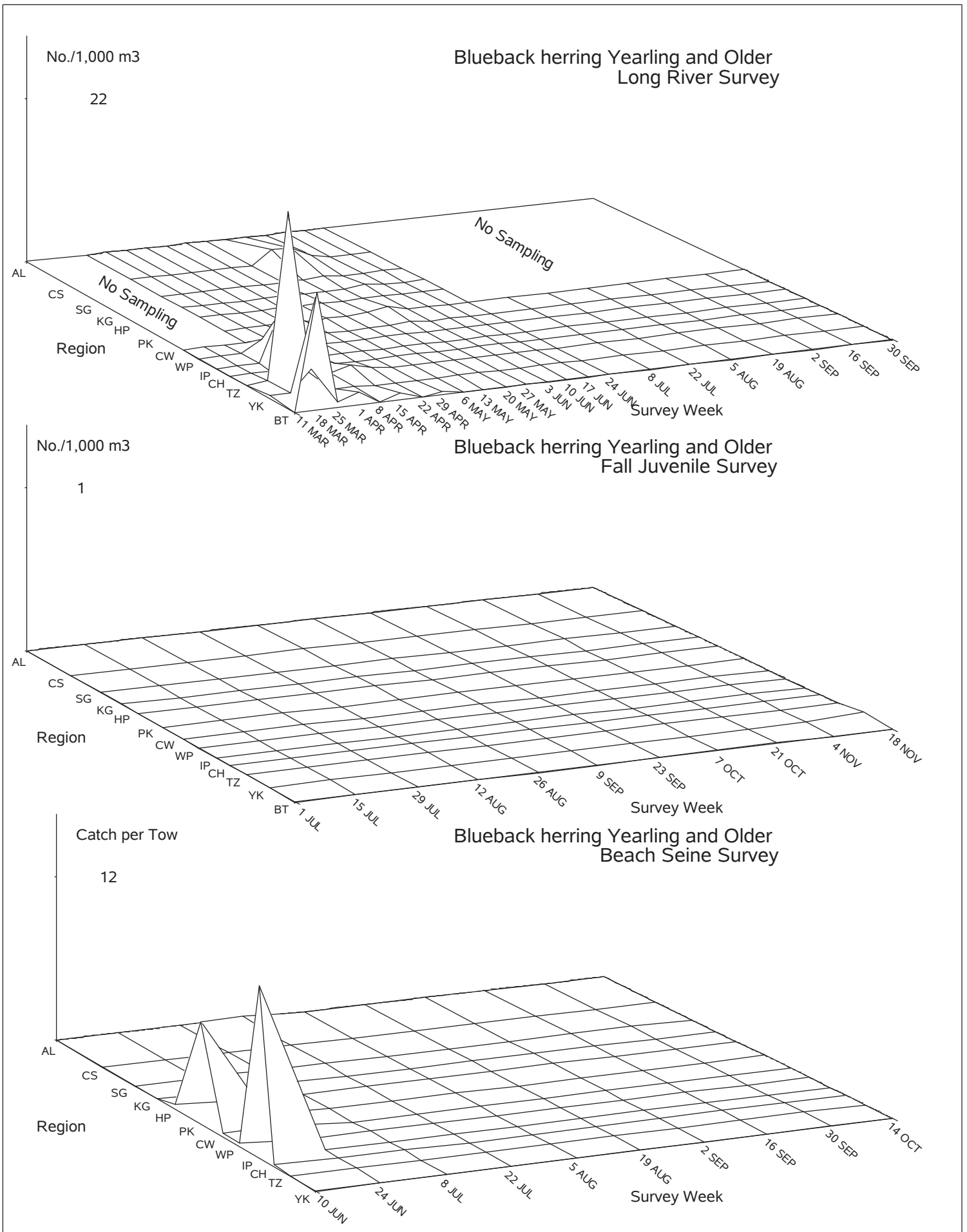


Figure 4-54. Spatiotemporal distribution of yearling and older blueback herring in the Hudson River estuary based on the 2013 Long River, Fall Juvenile, and Beach Seine surveys.

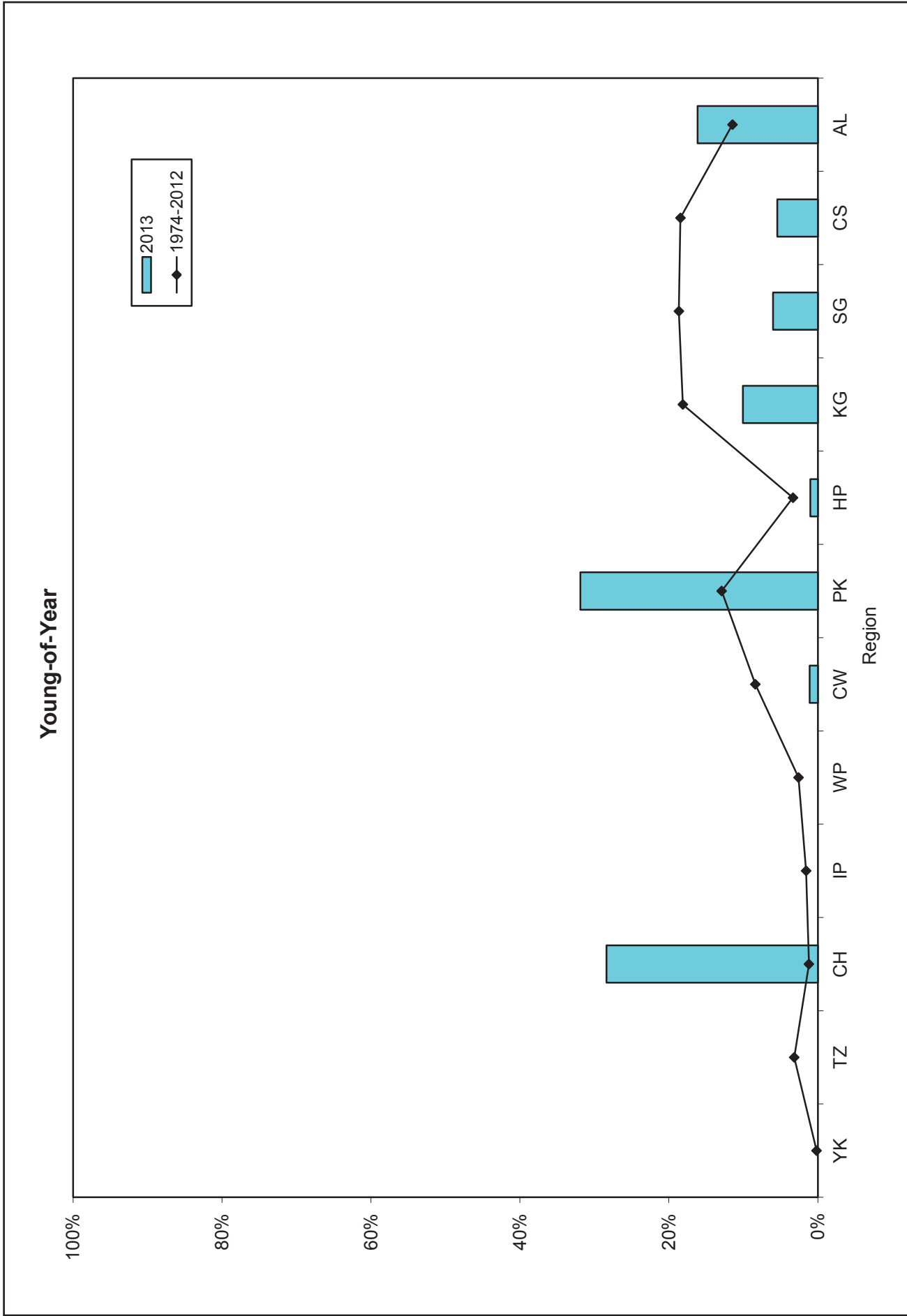


Figure 4-55. Geographic distribution indices for blueback herring collected during Beach Seine surveys of the Hudson River estuary, 1974-2013.

# Blueback herring

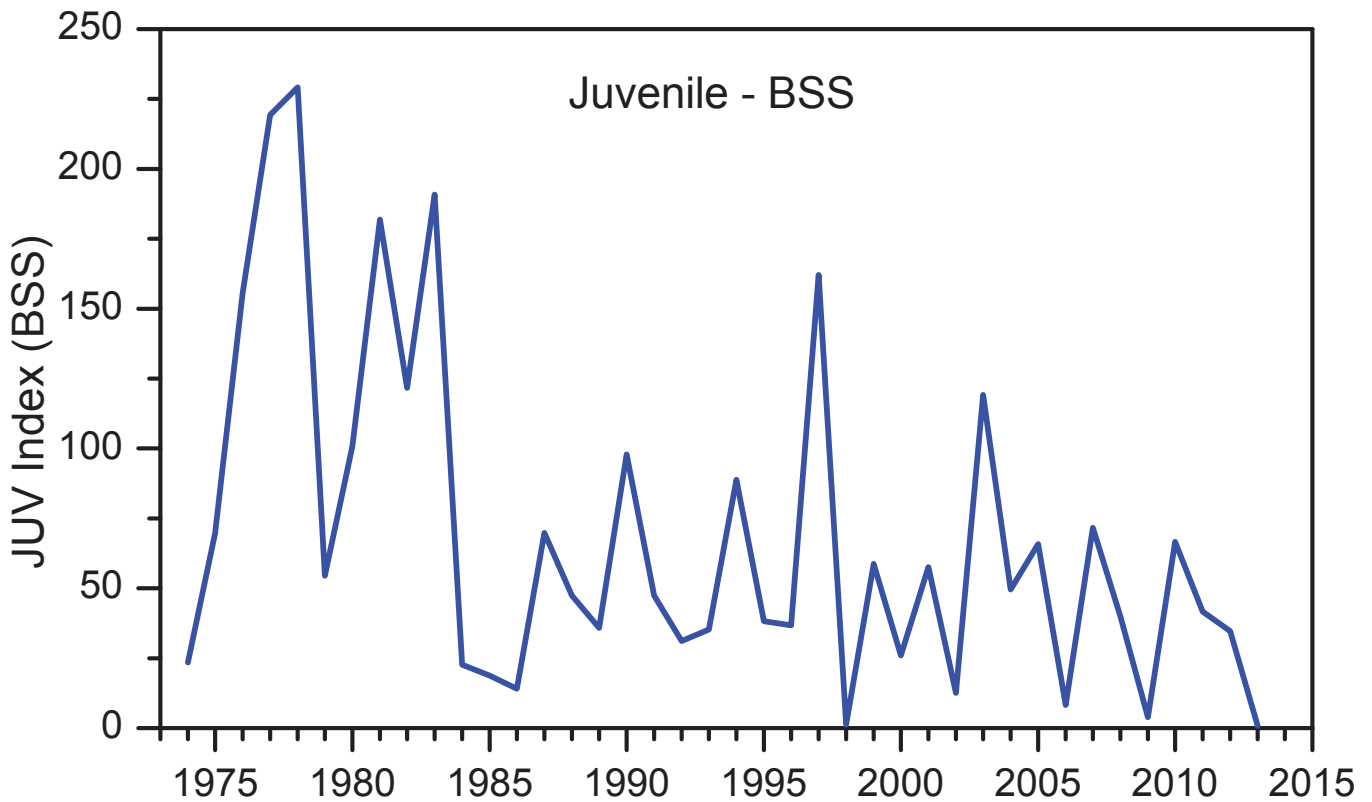
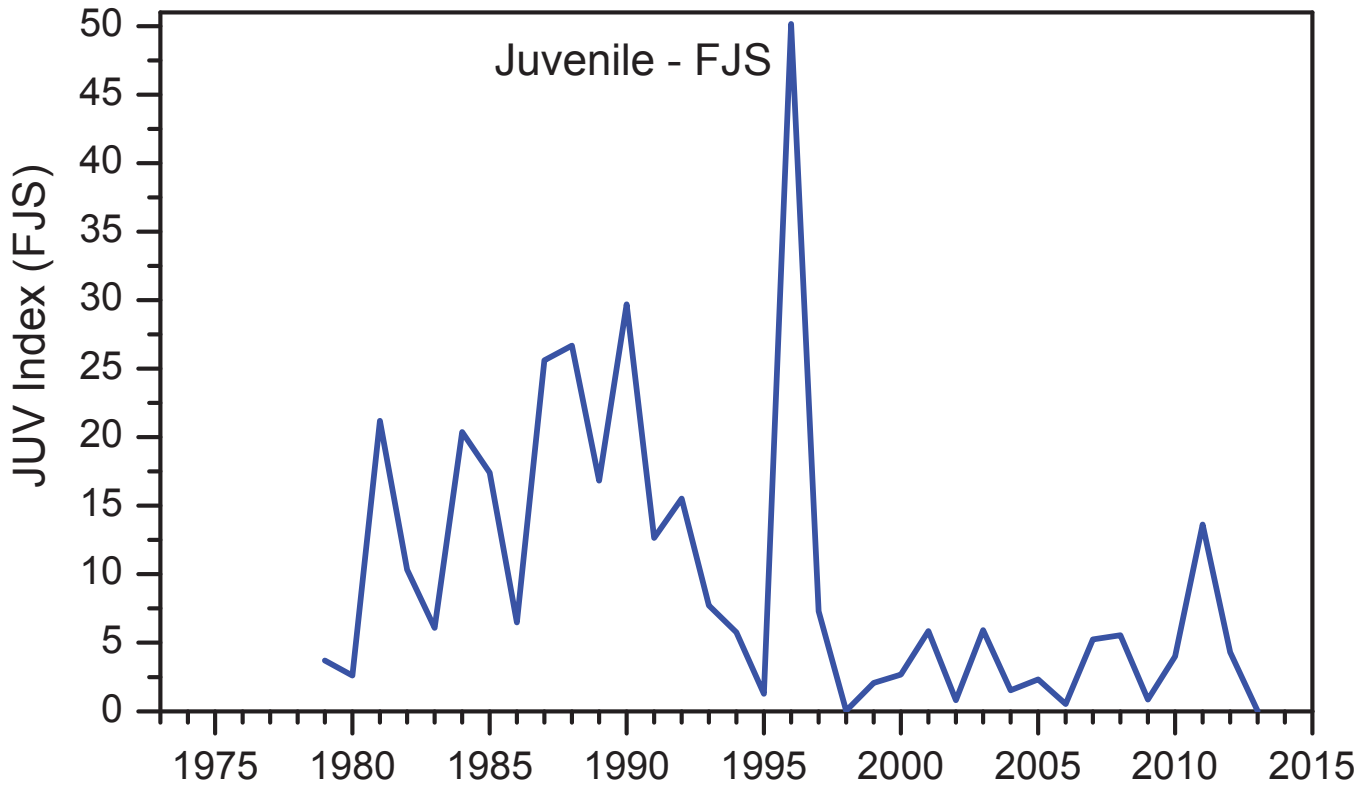


Figure 4-56. Blueback herring indices of annual abundance based on Fall Juvenile Survey, 1979-2013, and Beach Seine Survey, 1974-2013.



# Blueback herring

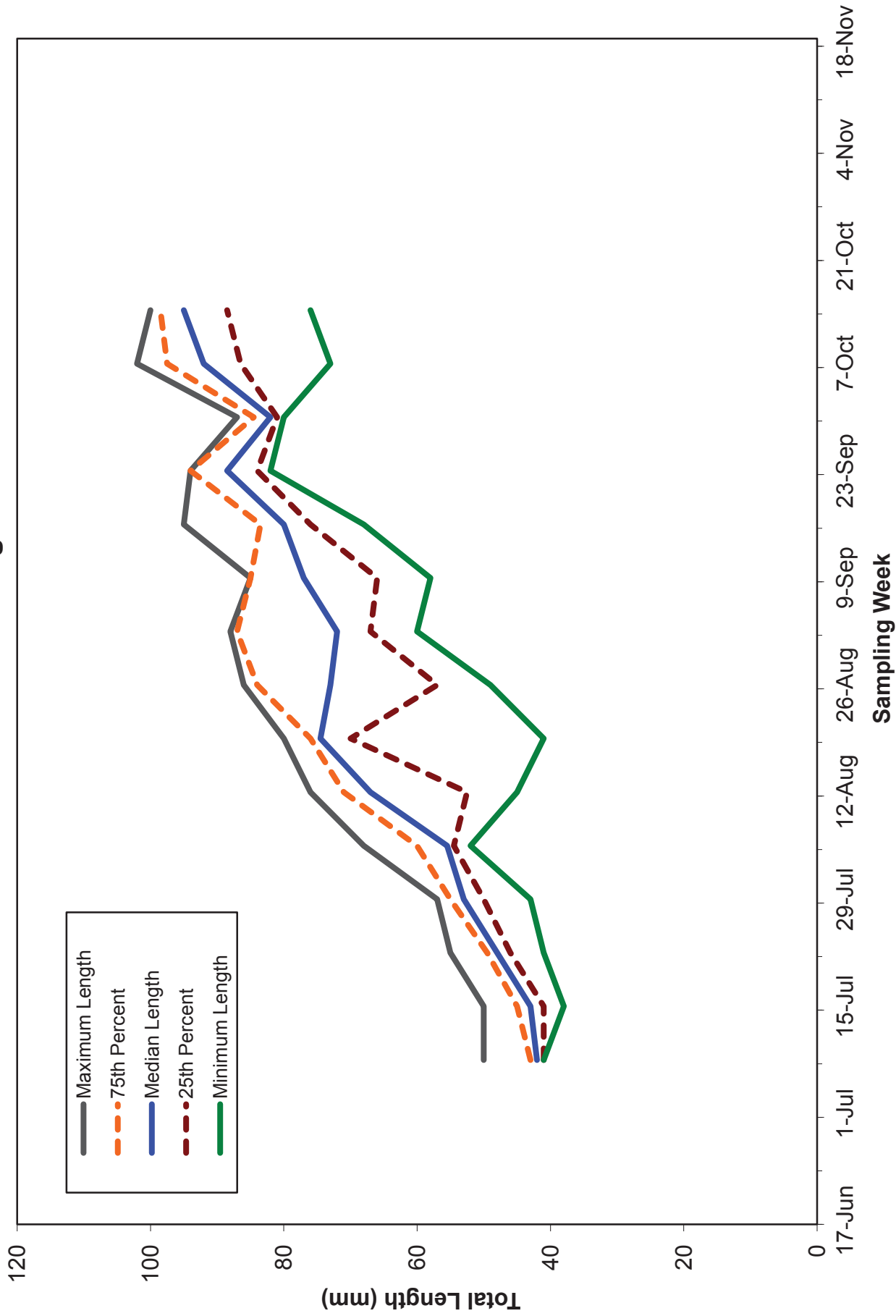


Figure 4-57. Weekly length statistics for young-of-year blueback herring in the Hudson River estuary, 2013.

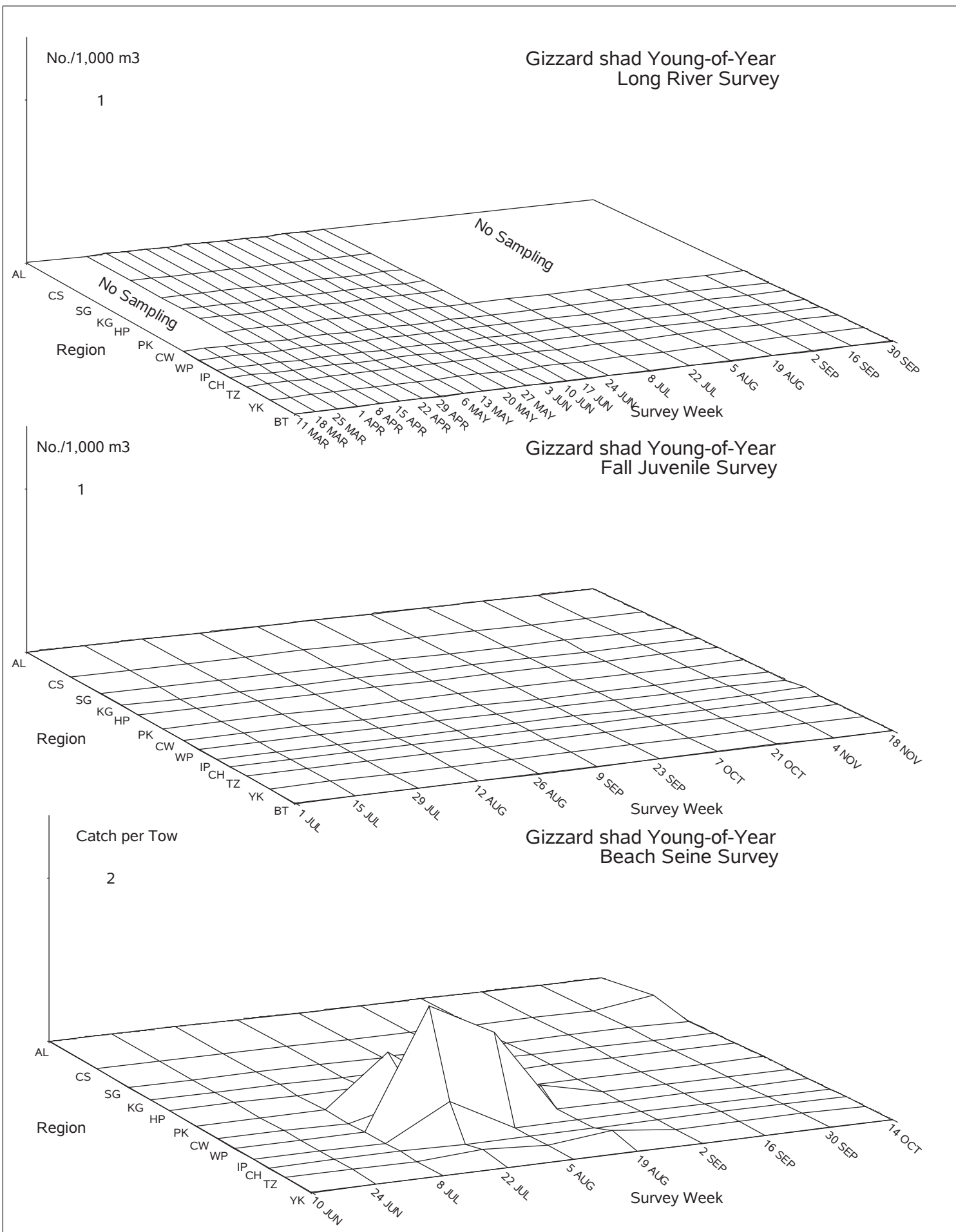


Figure 4-58. Spatiotemporal distribution of young-of-year gizzard shad in the Hudson River estuary based on the 2013 Long River, Fall Juvenile, and Beach Seine surveys.

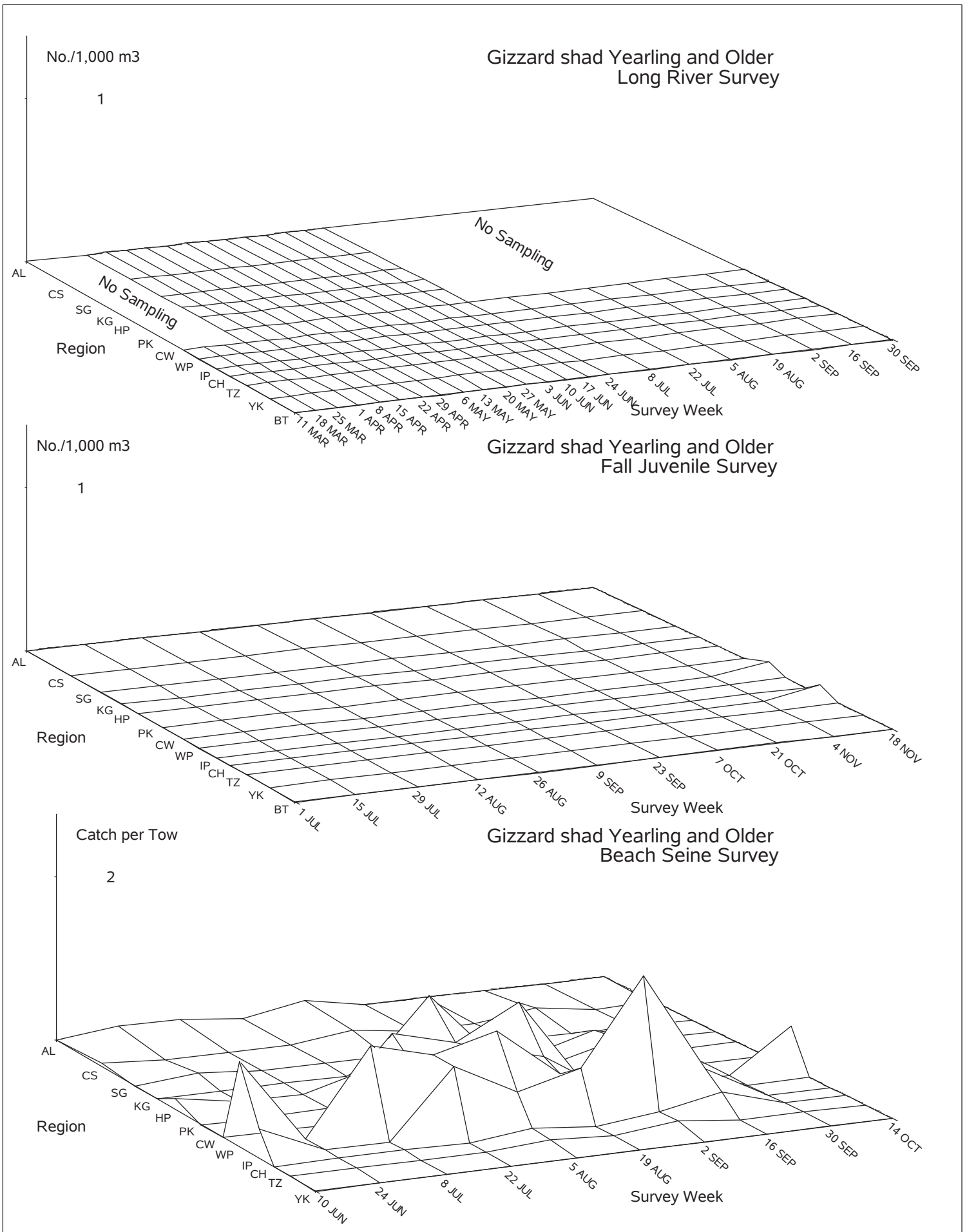


Figure 4-59. Spatiotemporal distribution of yearling and older gizzard shad in the Hudson River estuary based on the 2013 Long River, Fall Juvenile, and Beach Seine surveys.

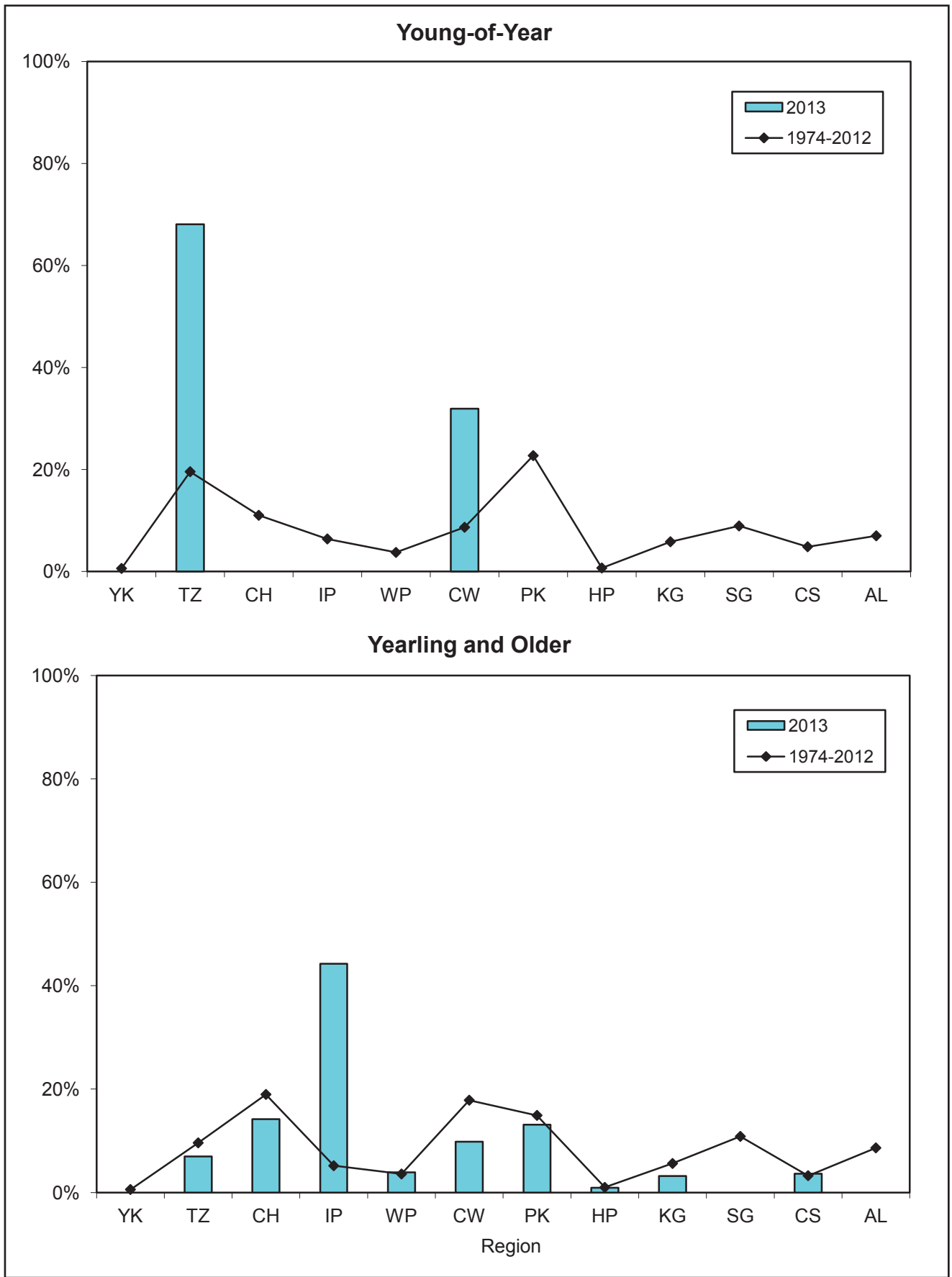


Figure 4-60. Geographic distribution indices for gizzard shad collected during Beach Seine surveys of the Hudson River estuary, 1974-2013.

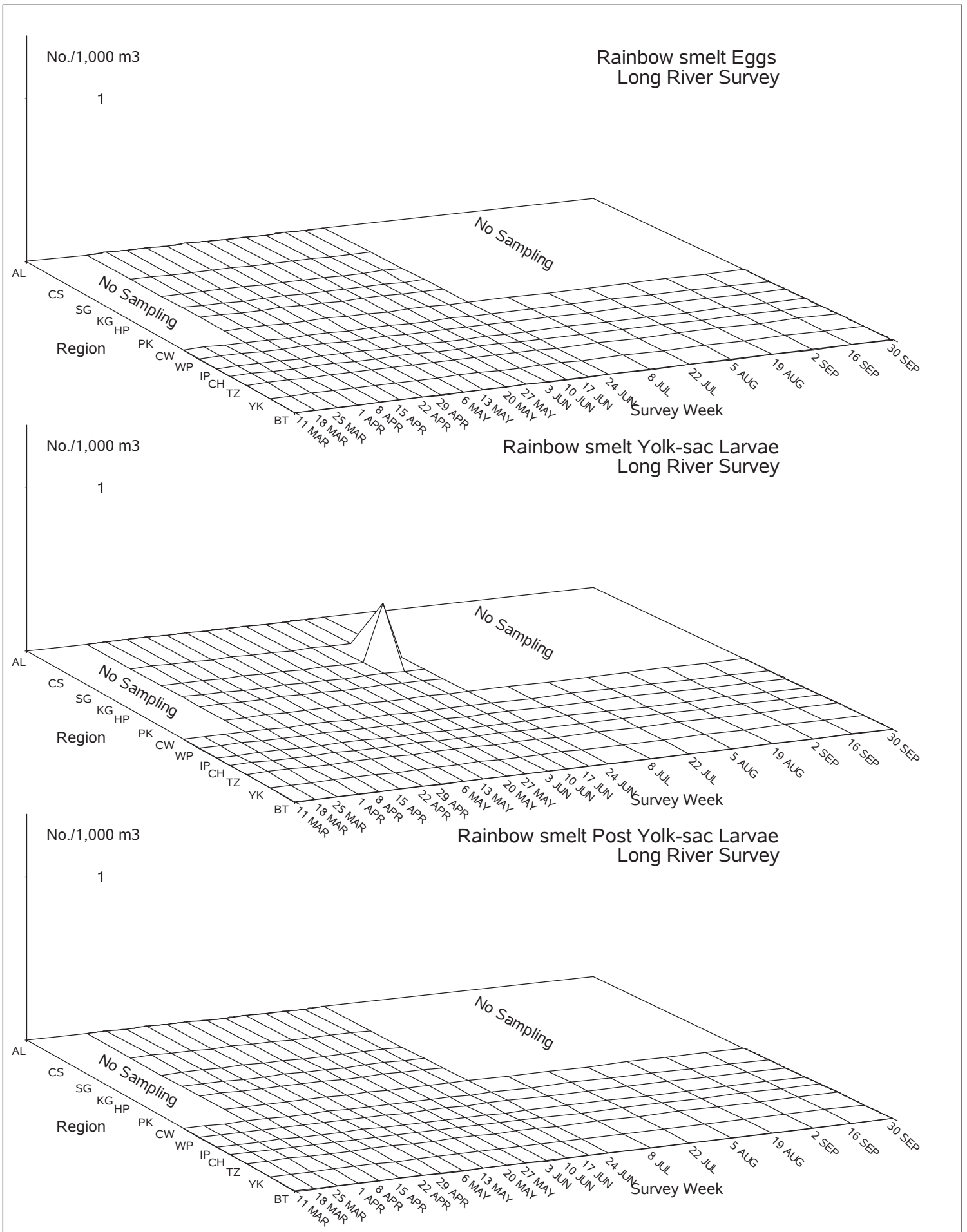


Figure 4-61. Spatiotemporal distribution of eggs, yolk-sac, and post yolk-sac larval rainbow smelt in the Hudson River estuary based on the 2013 Long River Survey.

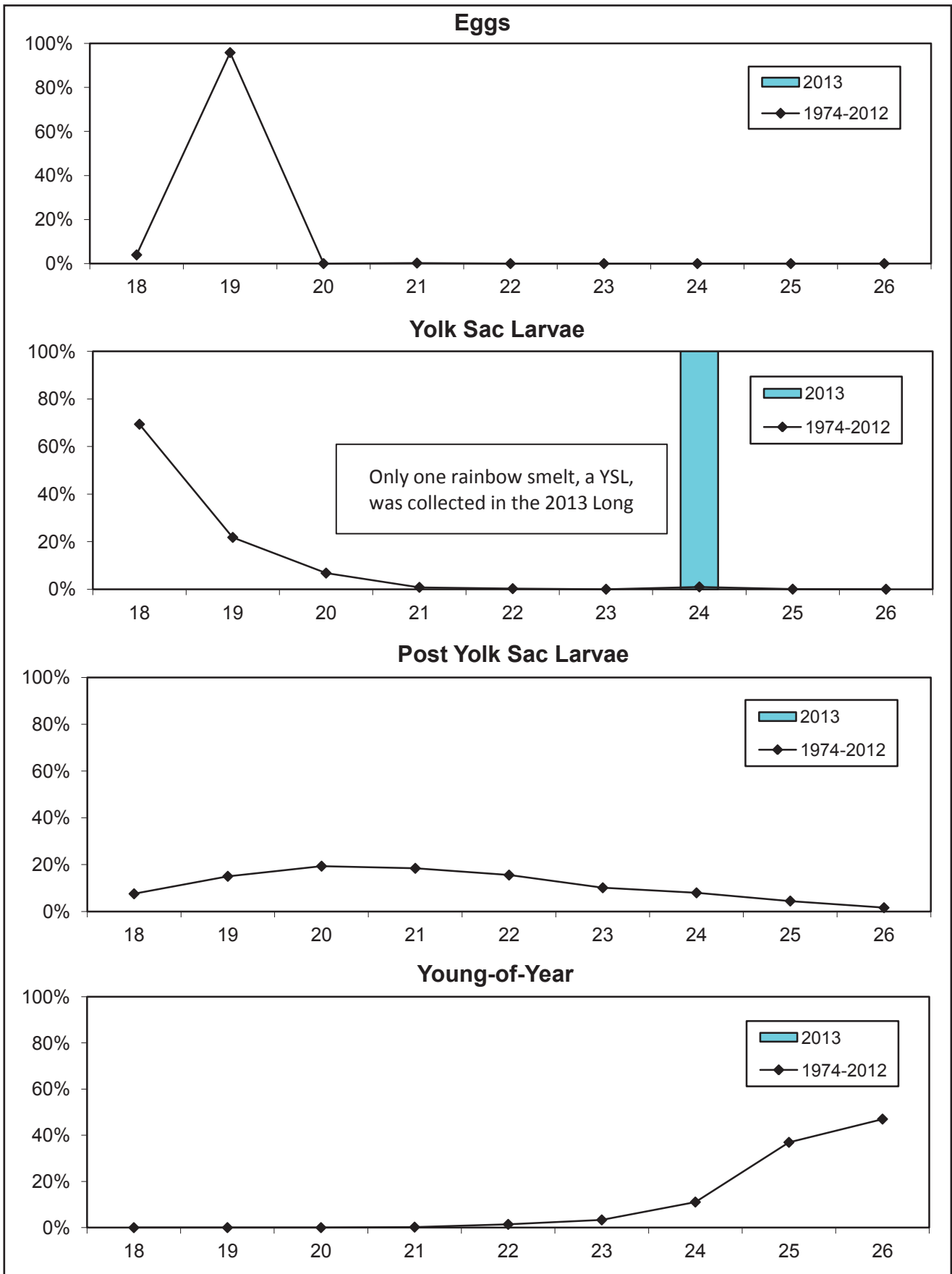


Figure 4-62. Temporal distribution indices for rainbow smelt collected during Long River surveys of the Hudson River estuary, 1974-2013.

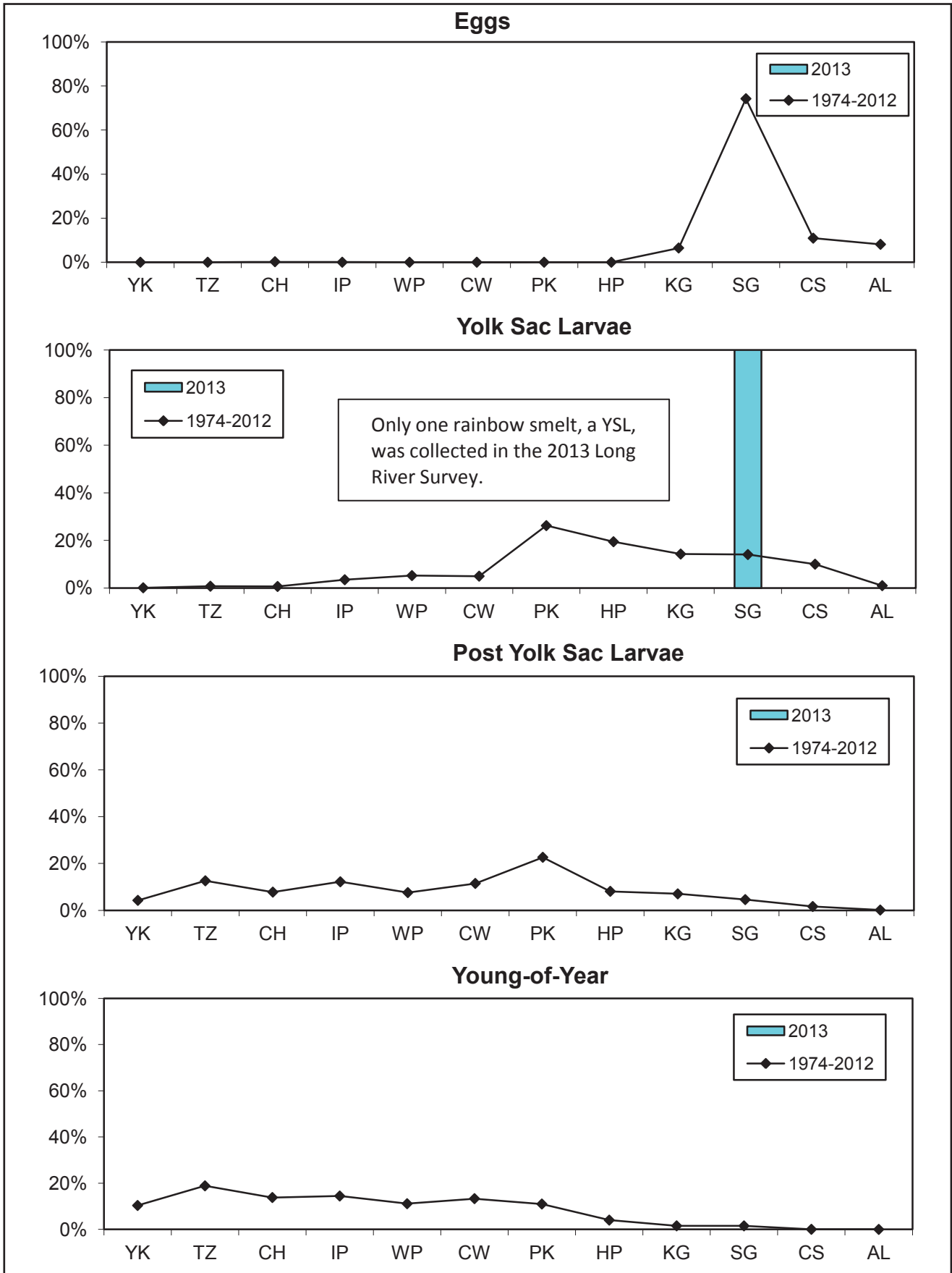


Figure 4-63. Geographic distribution indices for rainbow smelt collected during Long River surveys of the Hudson River estuary, 1974-2013.

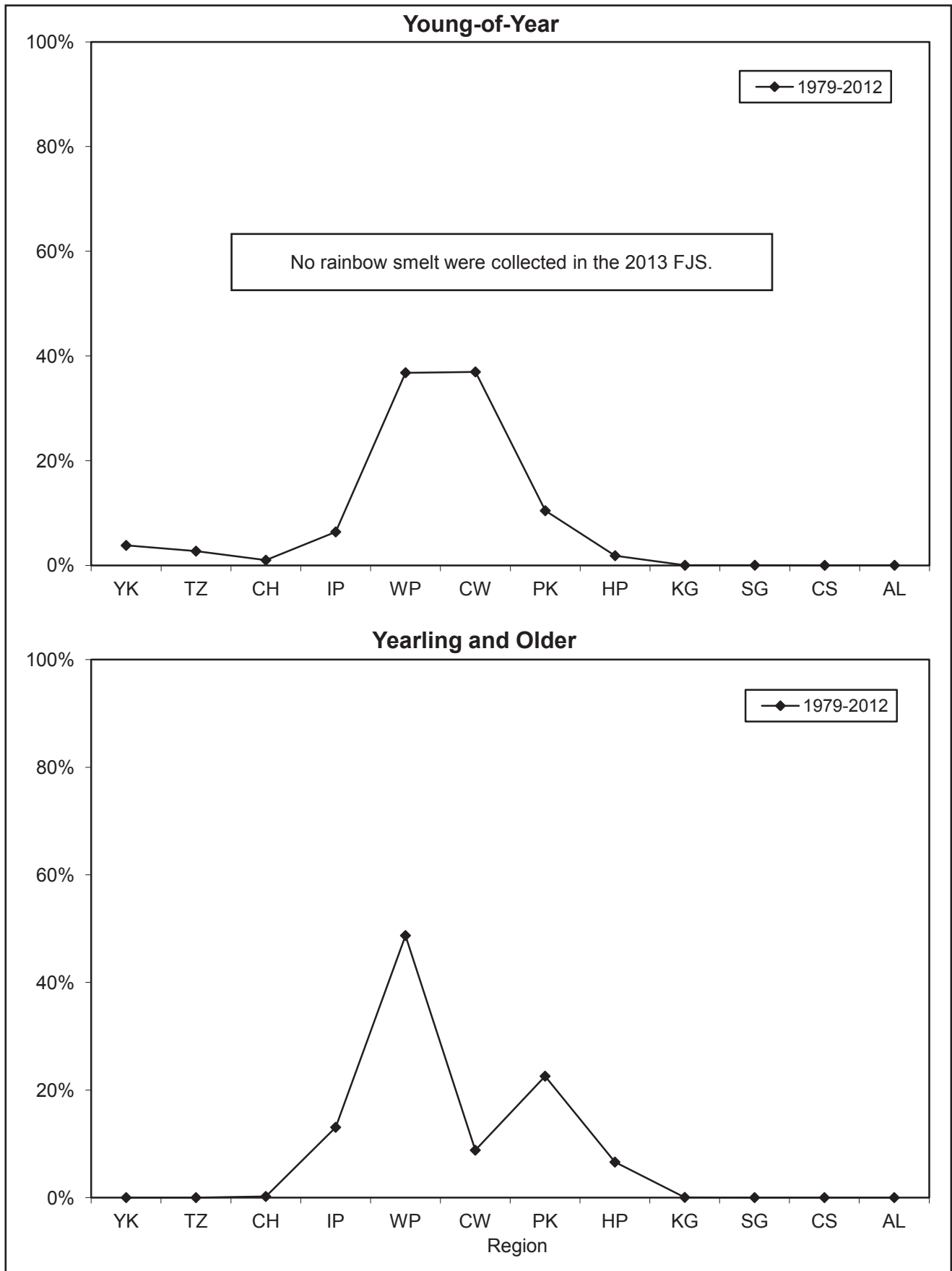


Figure 4-64. Geographic distribution indices for rainbow smelt collected during Fall Juvenile surveys of the Hudson River estuary, 1979-2013.



# Rainbow smelt

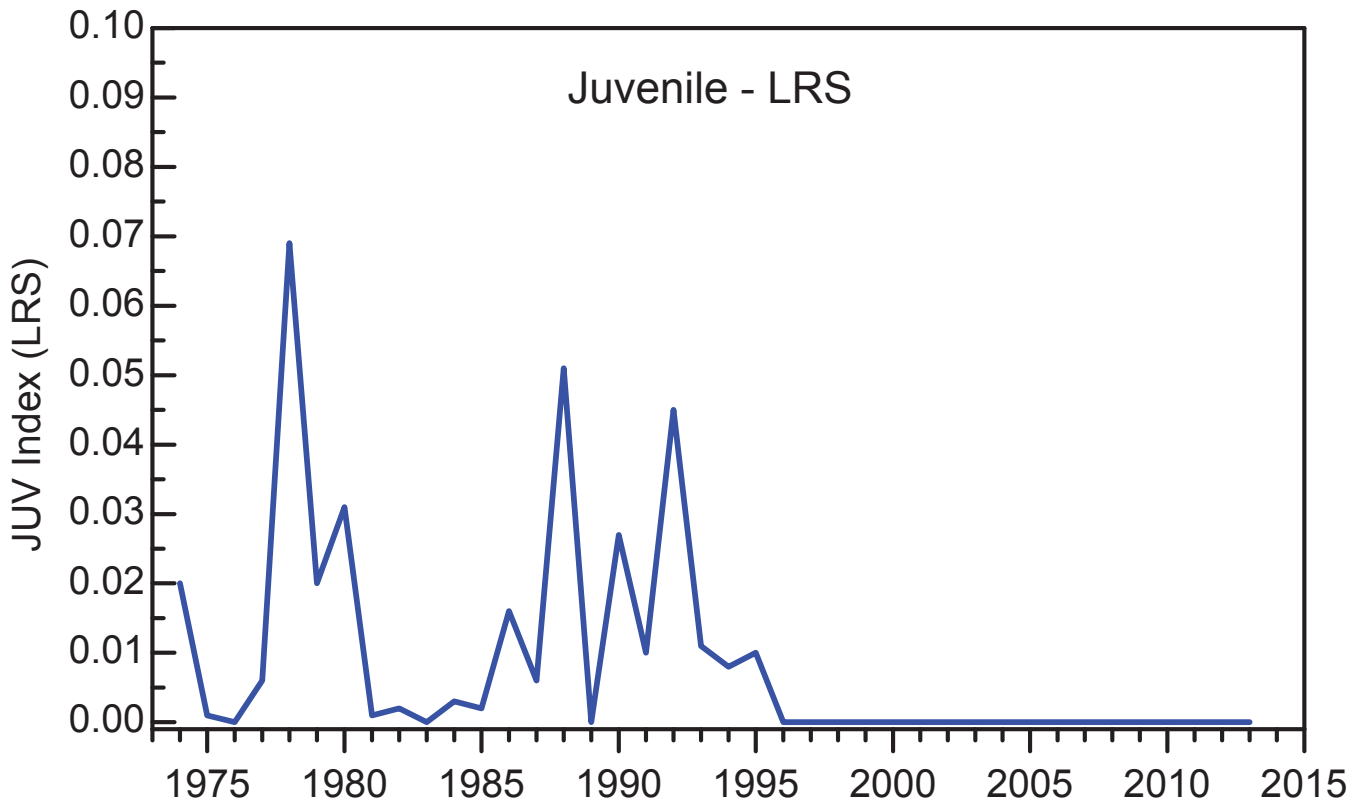
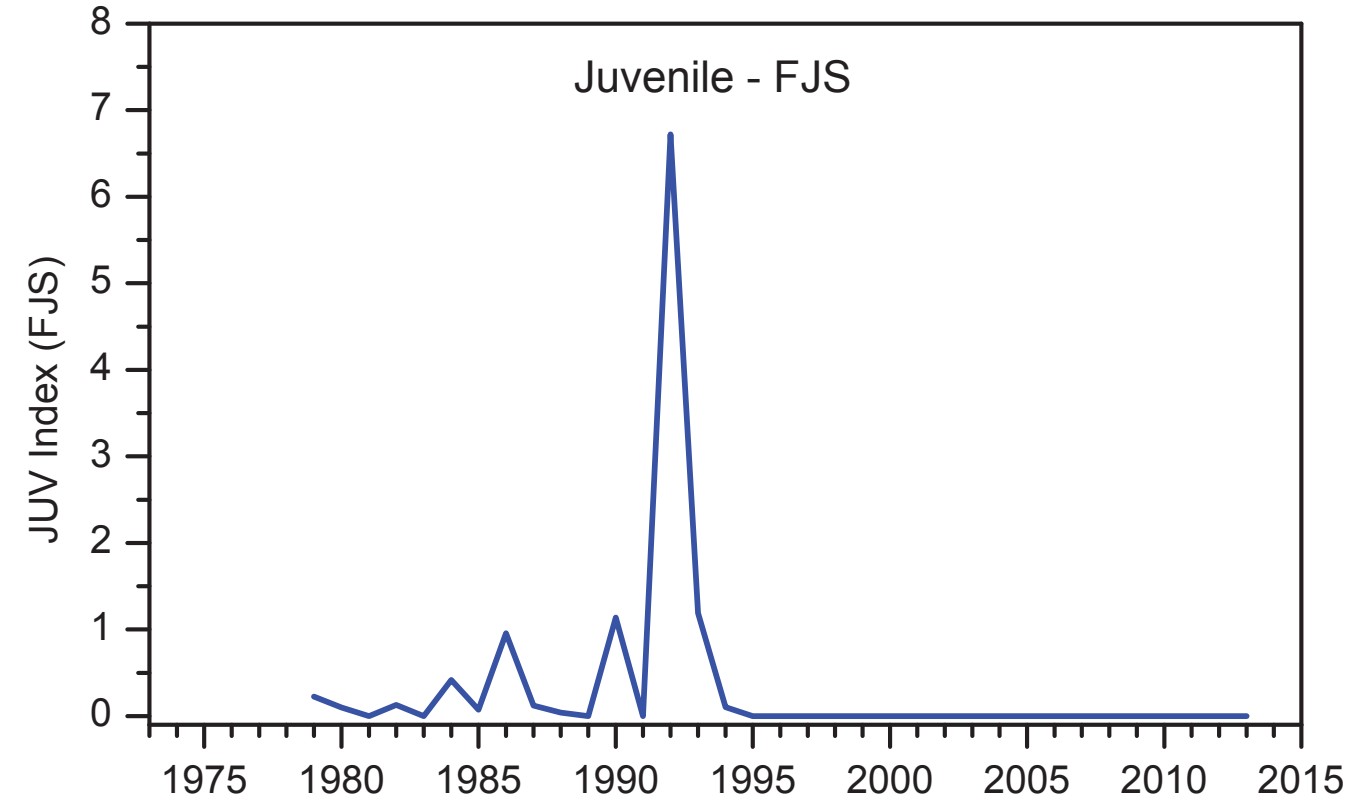


Figure 4-65. Rainbow smelt indices of annual abundance based on Fall Juvenile Survey, 1979-2013, and Long River Survey, 1974-2013.

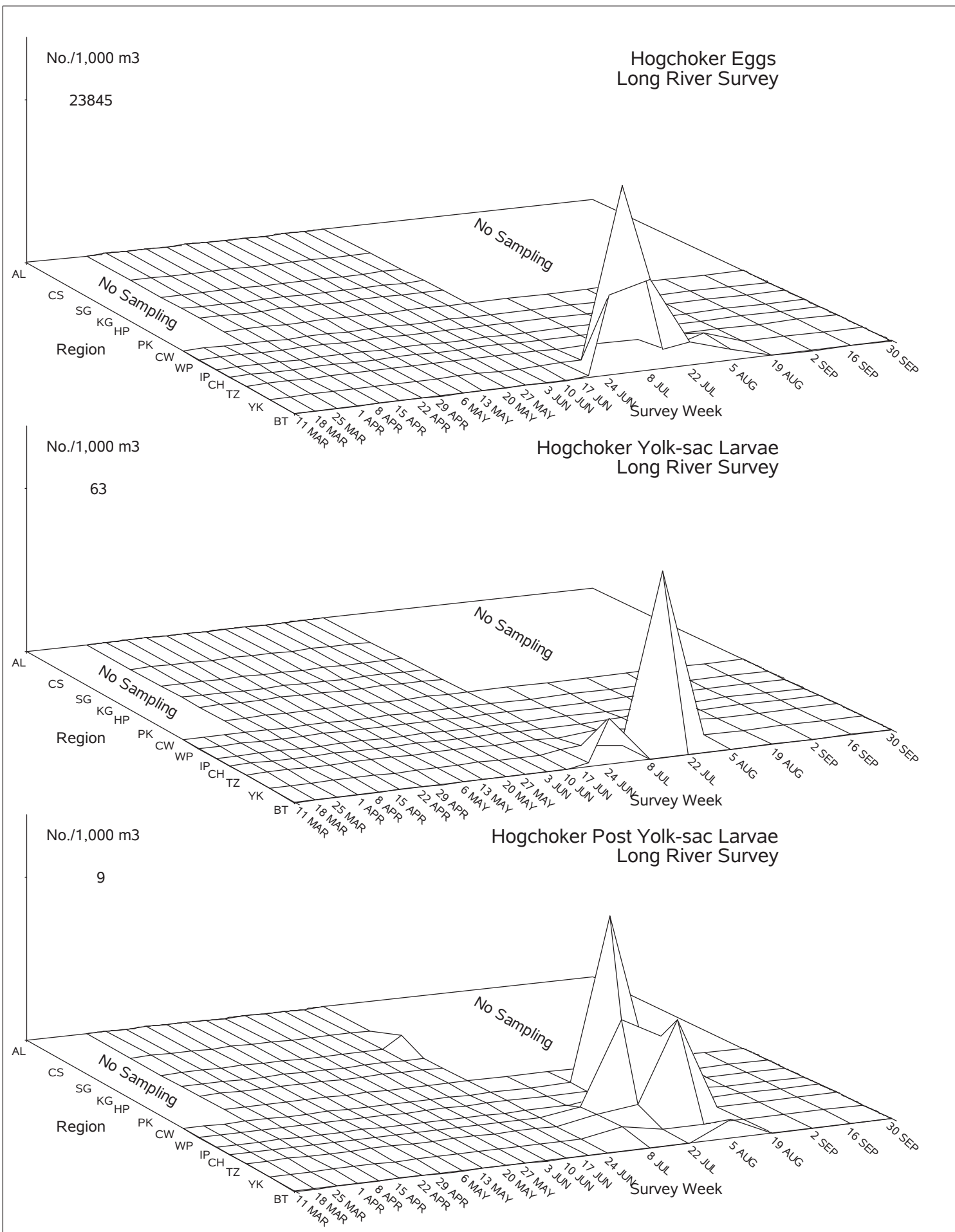


Figure 4-66. Spatiotemporal distribution of eggs, yolk-sac, and post yolk-sac larval hogchoker in the Hudson River estuary based on the 2013 Long River Survey.

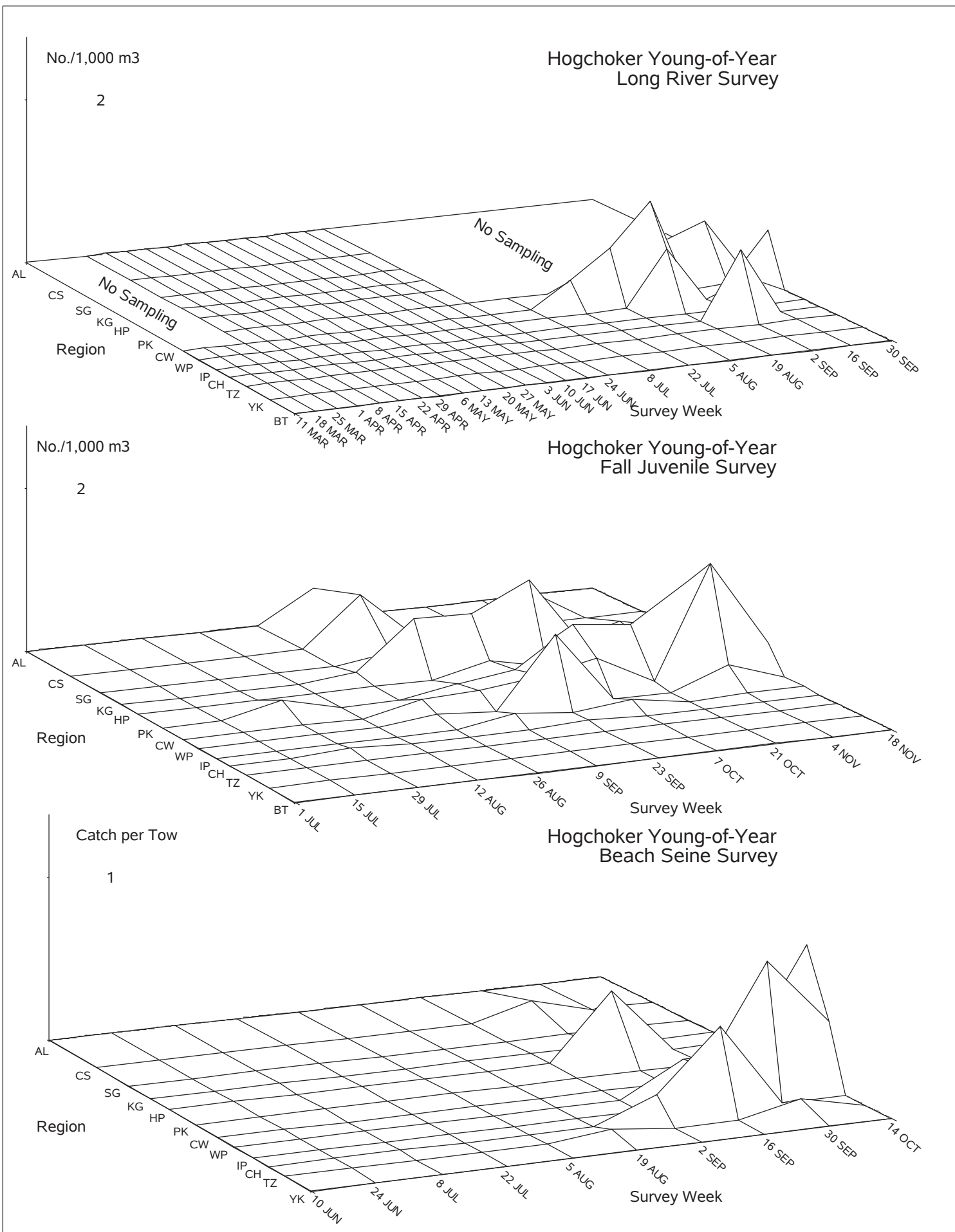


Figure 4-67. Spatiotemporal distribution of young-of-year hogchoker in the Hudson River estuary based on the 2013 Long River, Fall Juvenile, and Beach Seine surveys.

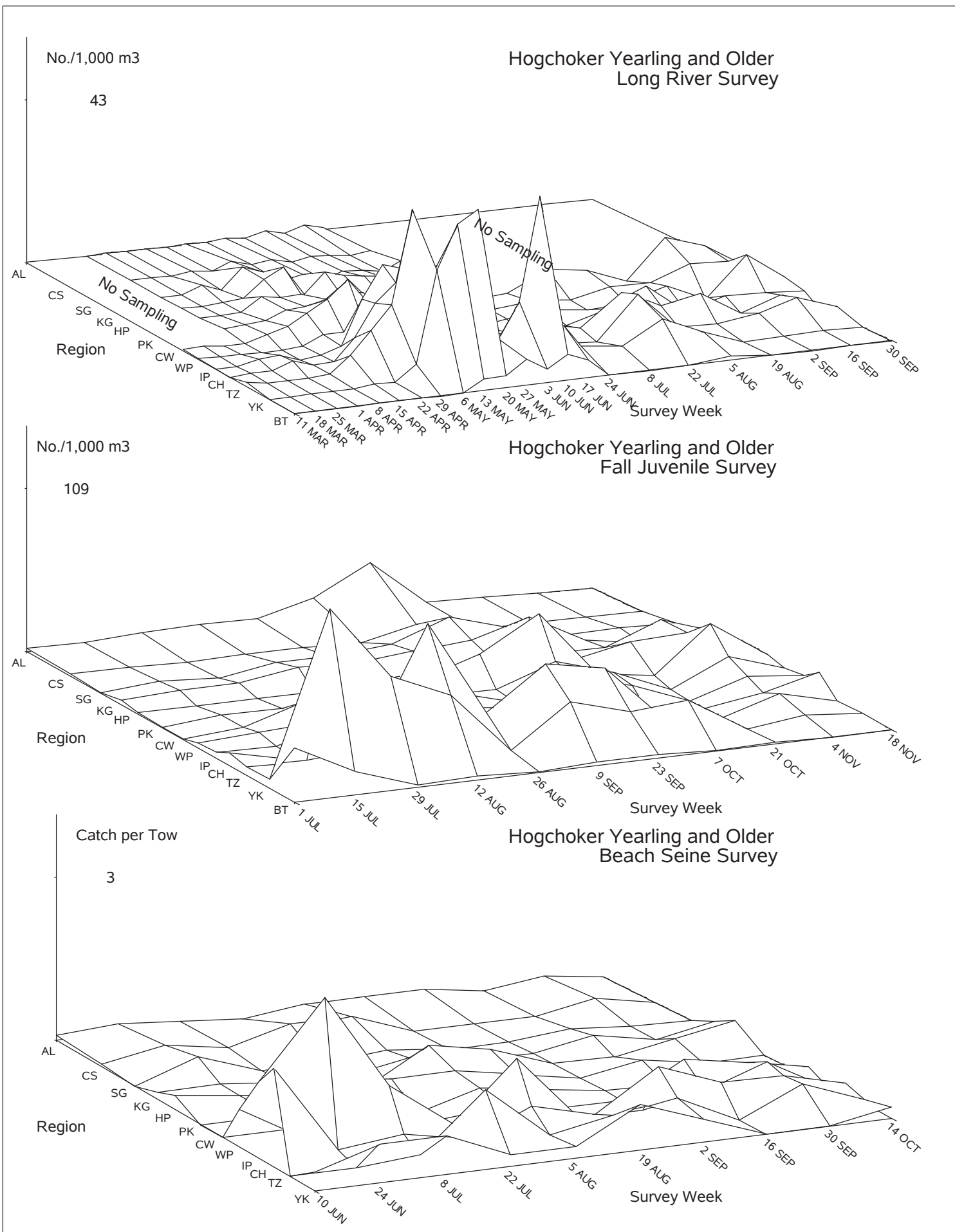


Figure 4-68. Spatiotemporal distribution of yearling and older hogchoker in the Hudson River estuary based on the 2013 Long River, Fall Juvenile, and Beach Seine surveys.

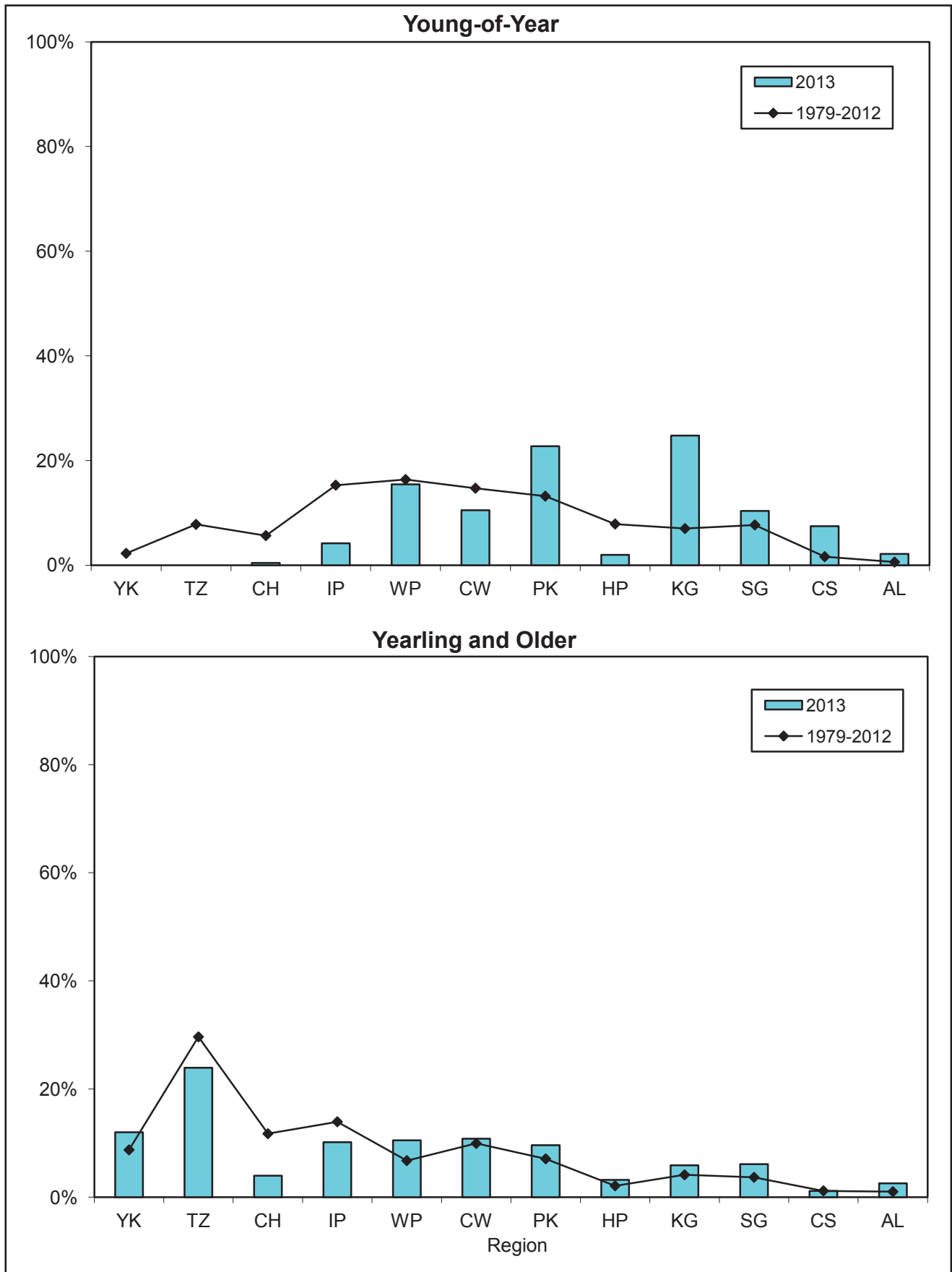


Figure 4-69. Geographic distribution indices for hogchoker collected during Fall Juvenile surveys of the Hudson River estuary, 1979-2013.

# Hogchoker

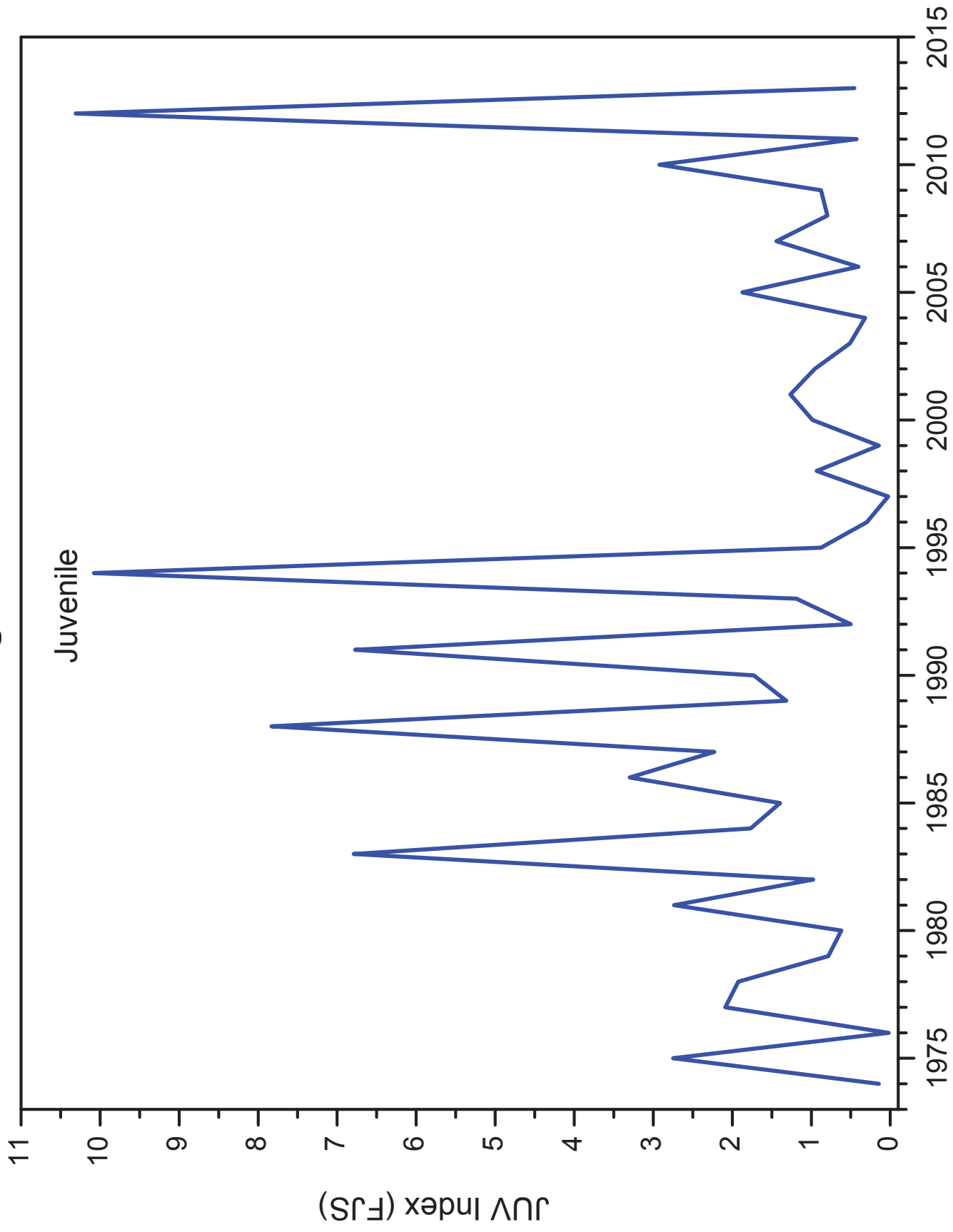


Figure 4-70. Hogchoker indices of annual abundance based on Fall Juvenile Survey, 1974-2013.

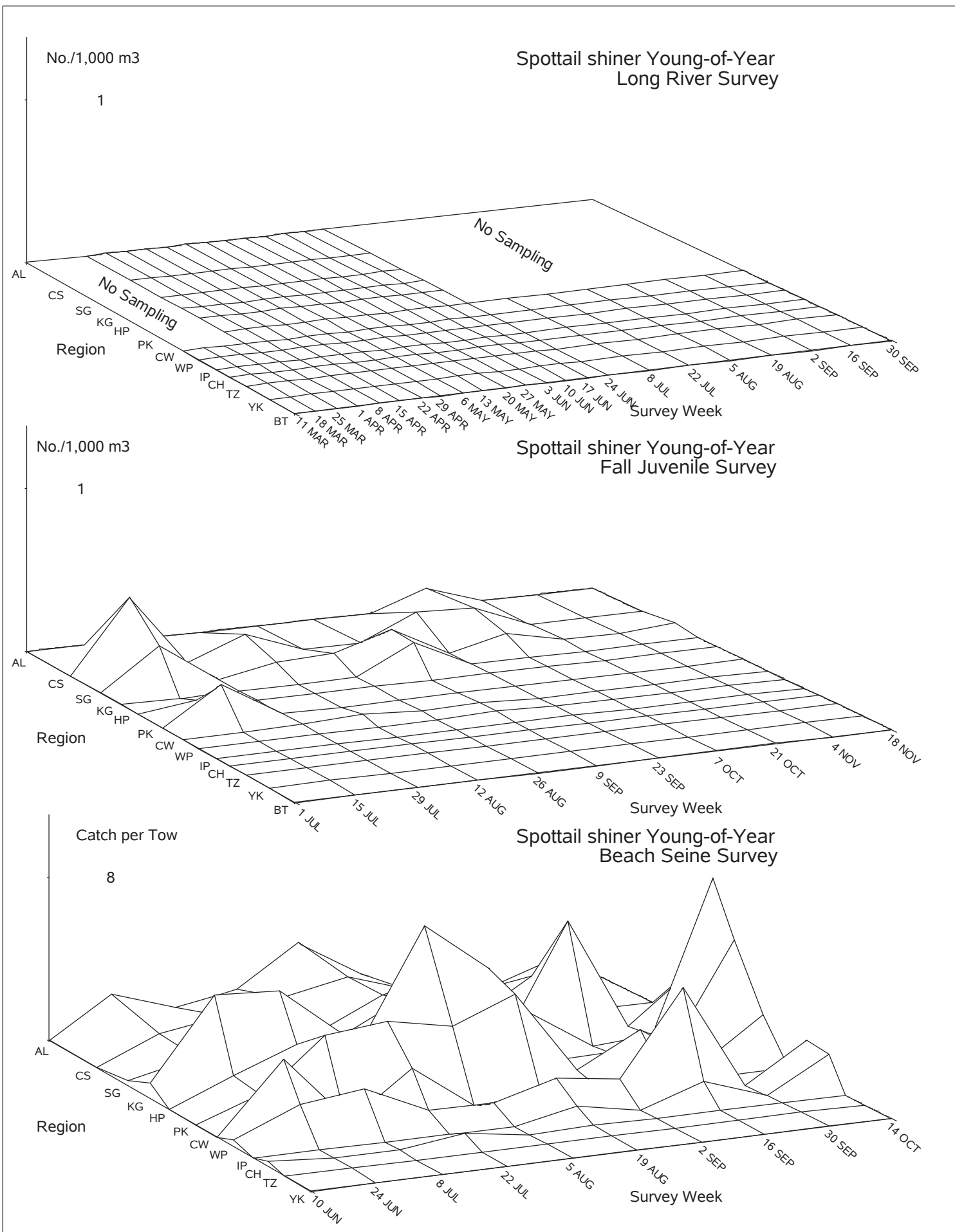


Figure 4-71. Spatiotemporal distribution of young-of-year spottail shiner in the Hudson River estuary based on the 2013 Long River, Fall Juvenile, and Beach Seine surveys.

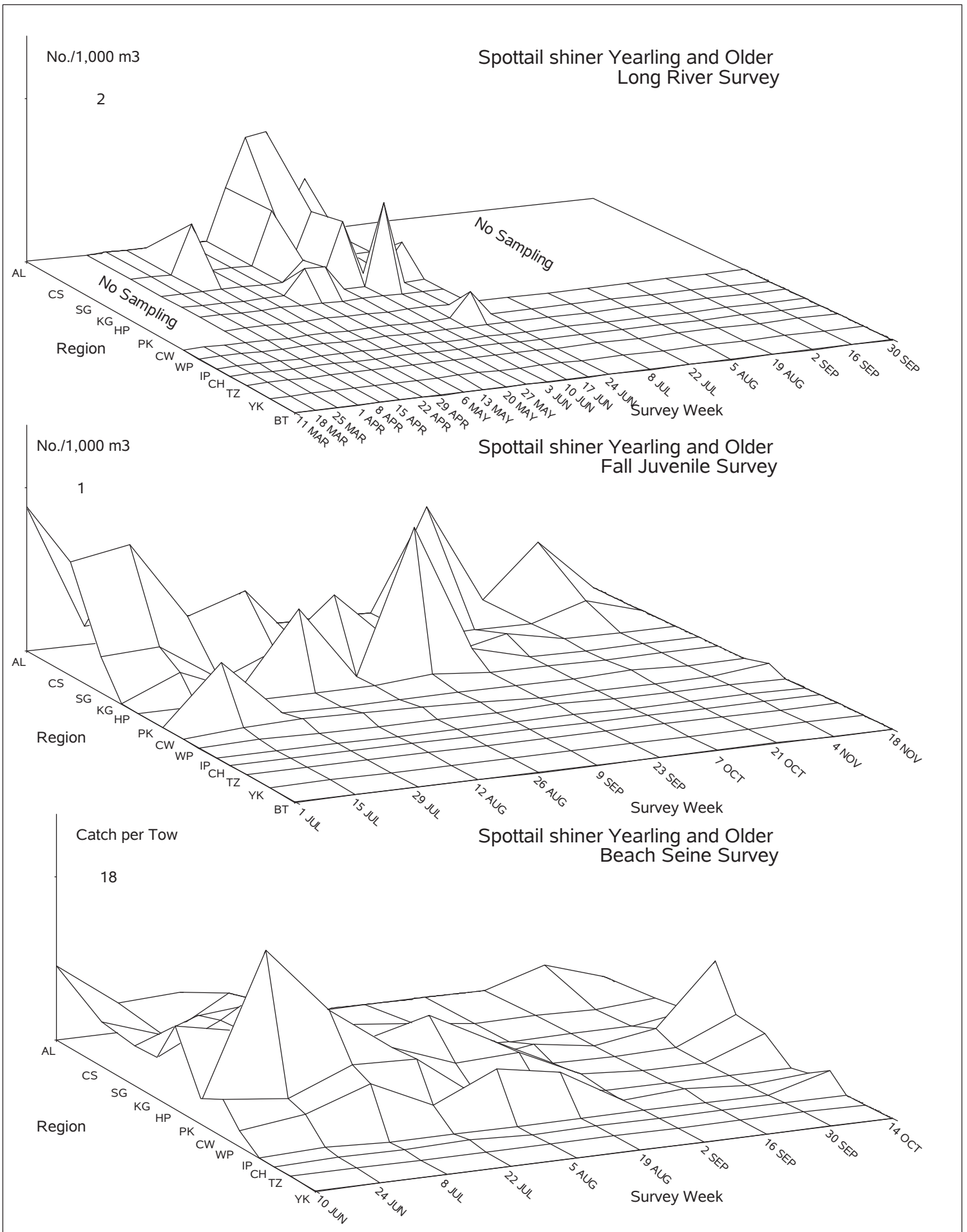


Figure 4-72. Spatiotemporal distribution of yearling and older spottail shiner in the Hudson River estuary based on the 2013 Long River, Fall Juvenile, and Beach Seine surveys.



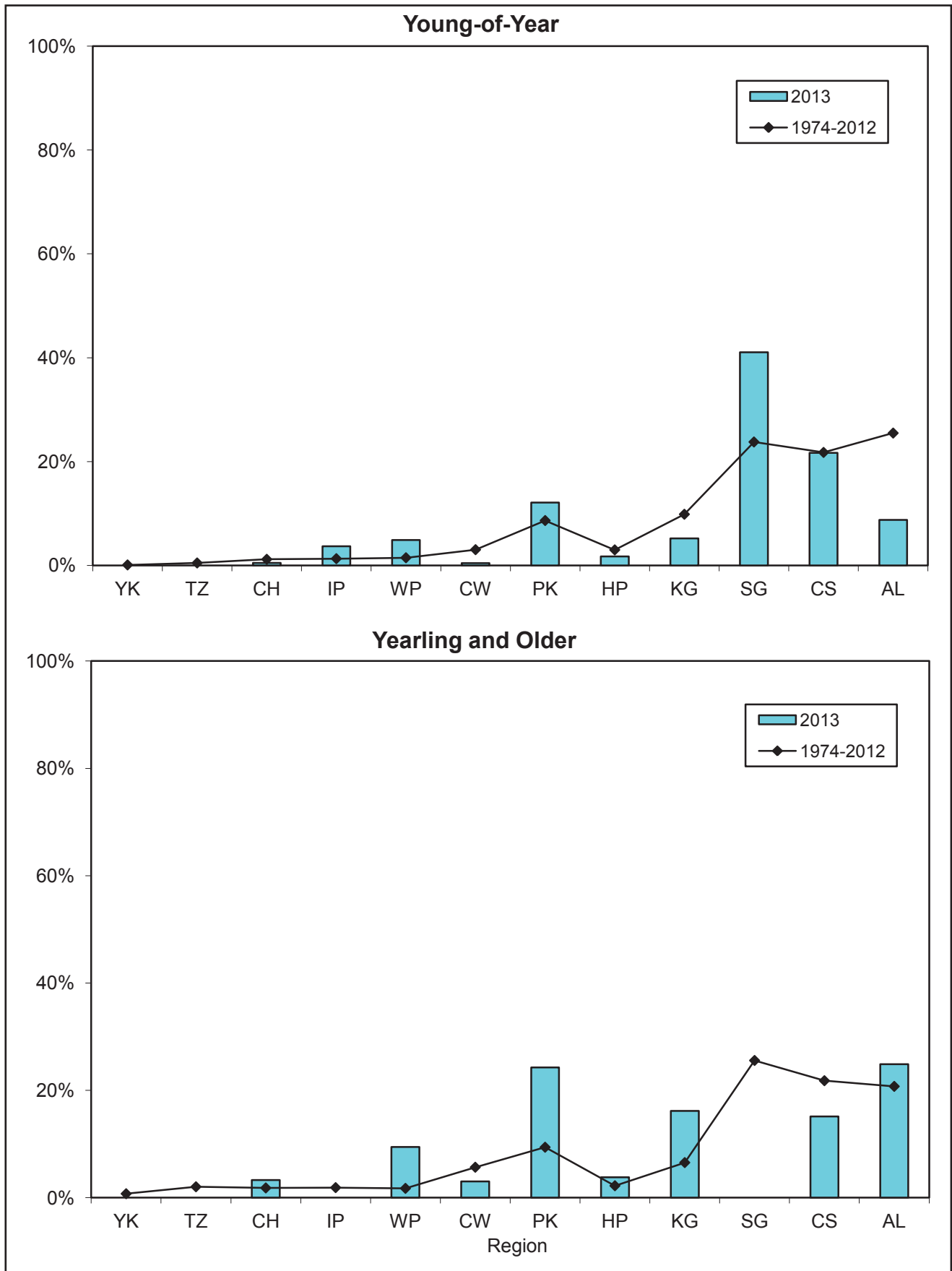


Figure 4-73. Geographic distribution indices for spottail shiner collected during Beach Seine surveys of the Hudson River estuary, 1974-2013.

# Spottail shiner

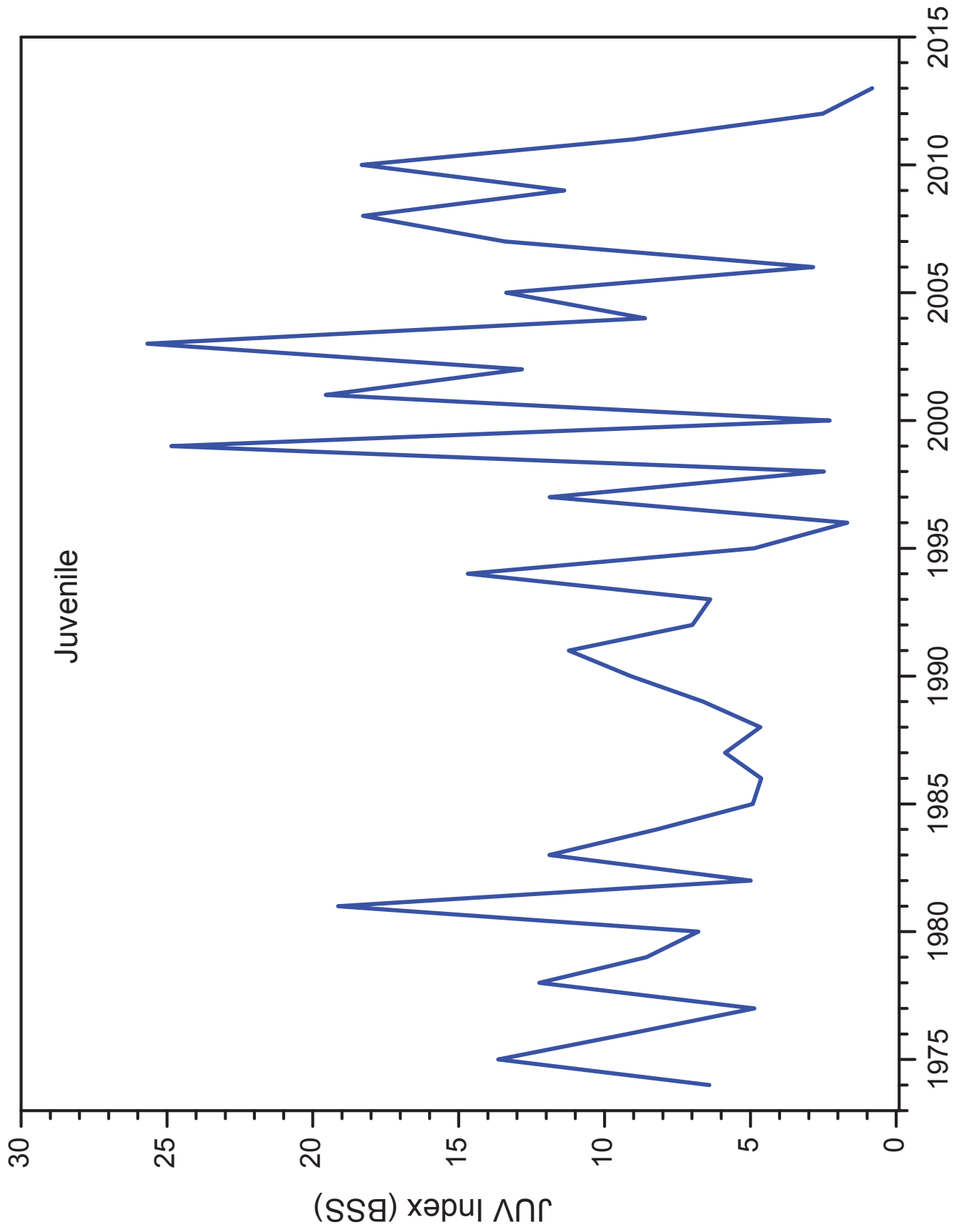


Figure 4-74. Spottail shiner indices of annual abundance based on Beach Seine Survey, 1974-2013.

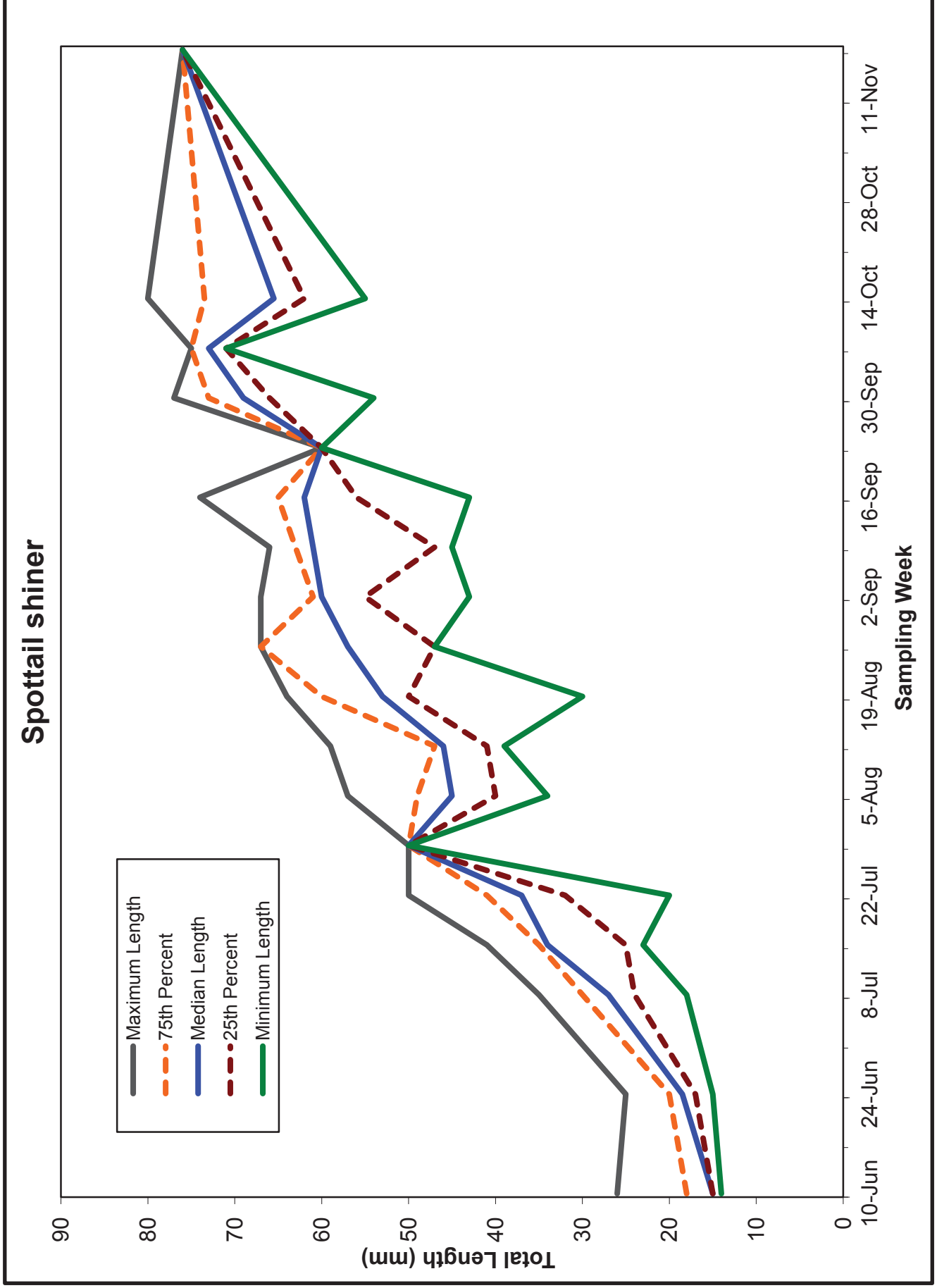


Figure 4-75. Weekly length statistics for young-of-year spottail shiner in the Hudson River estuary, 2013.

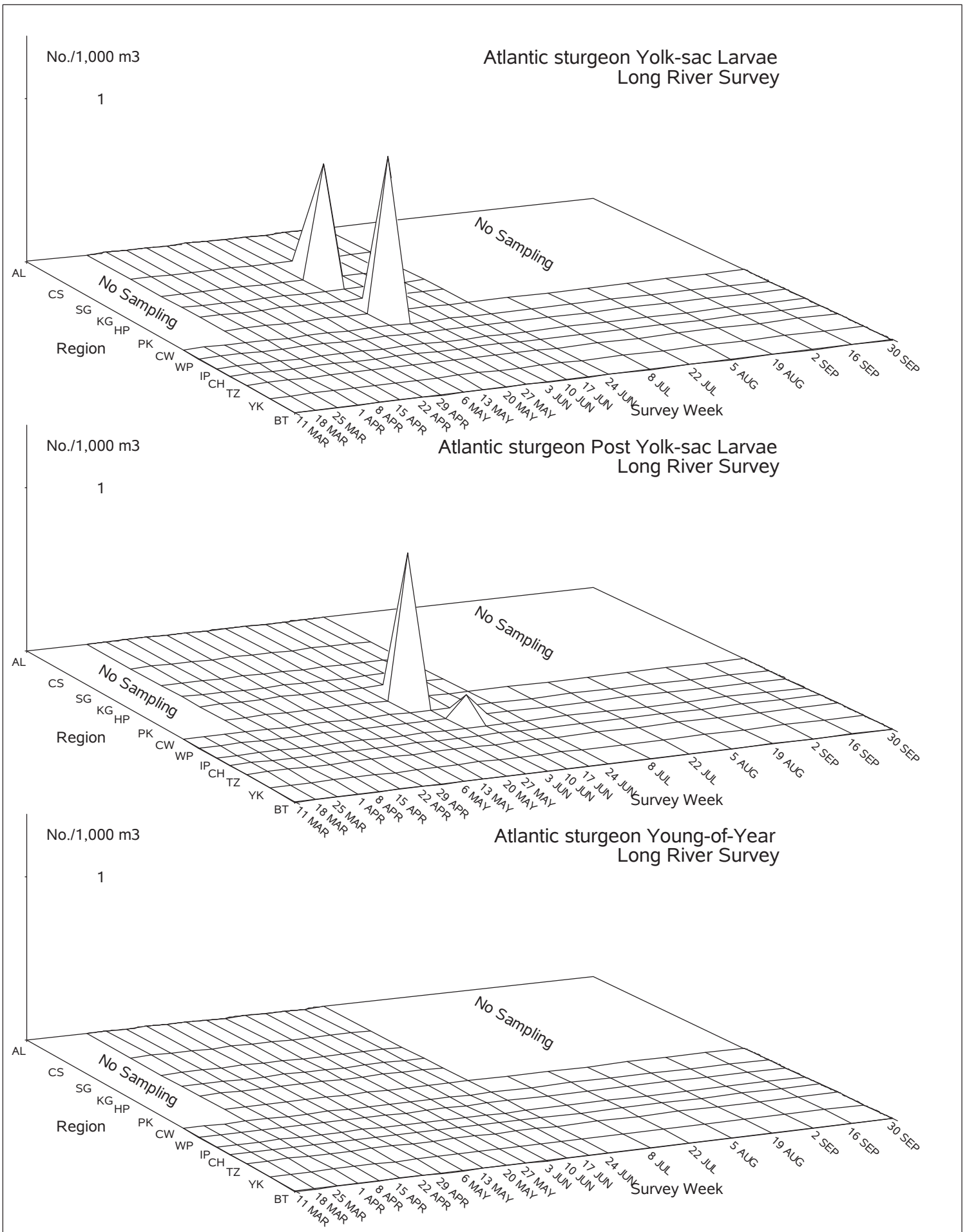


Figure 4-76. Spatiotemporal distribution of yolk-sac, post yolk-sac larval, and young-of-year Atlantic sturgeon in the Hudson River estuary based on the 2013 Long River Survey.

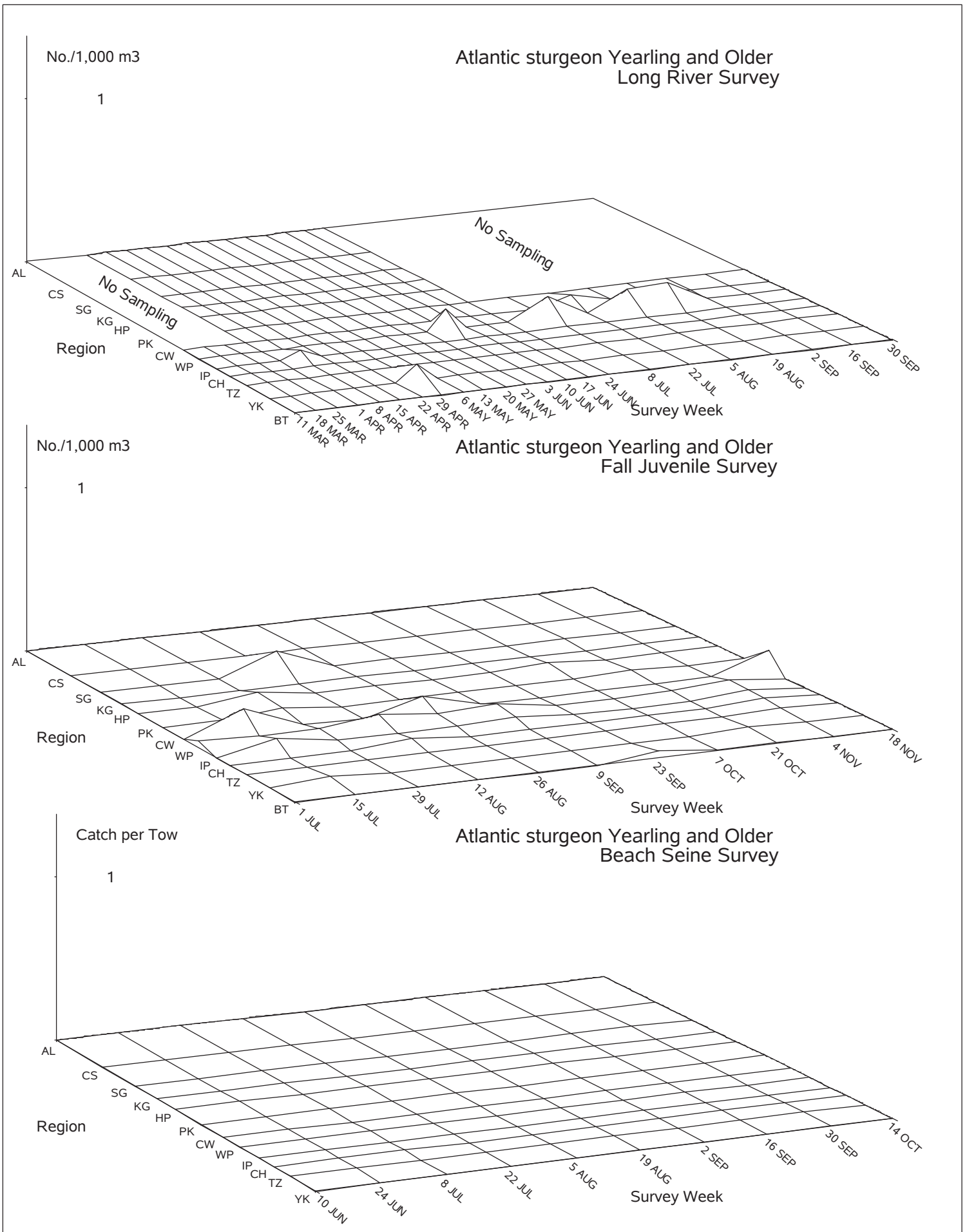


Figure 4-77. Spatiotemporal distribution of yearling and older Atlantic sturgeon in the Hudson River estuary based on the 2013 Long River, Fall Juvenile, and Beach Seine surveys.

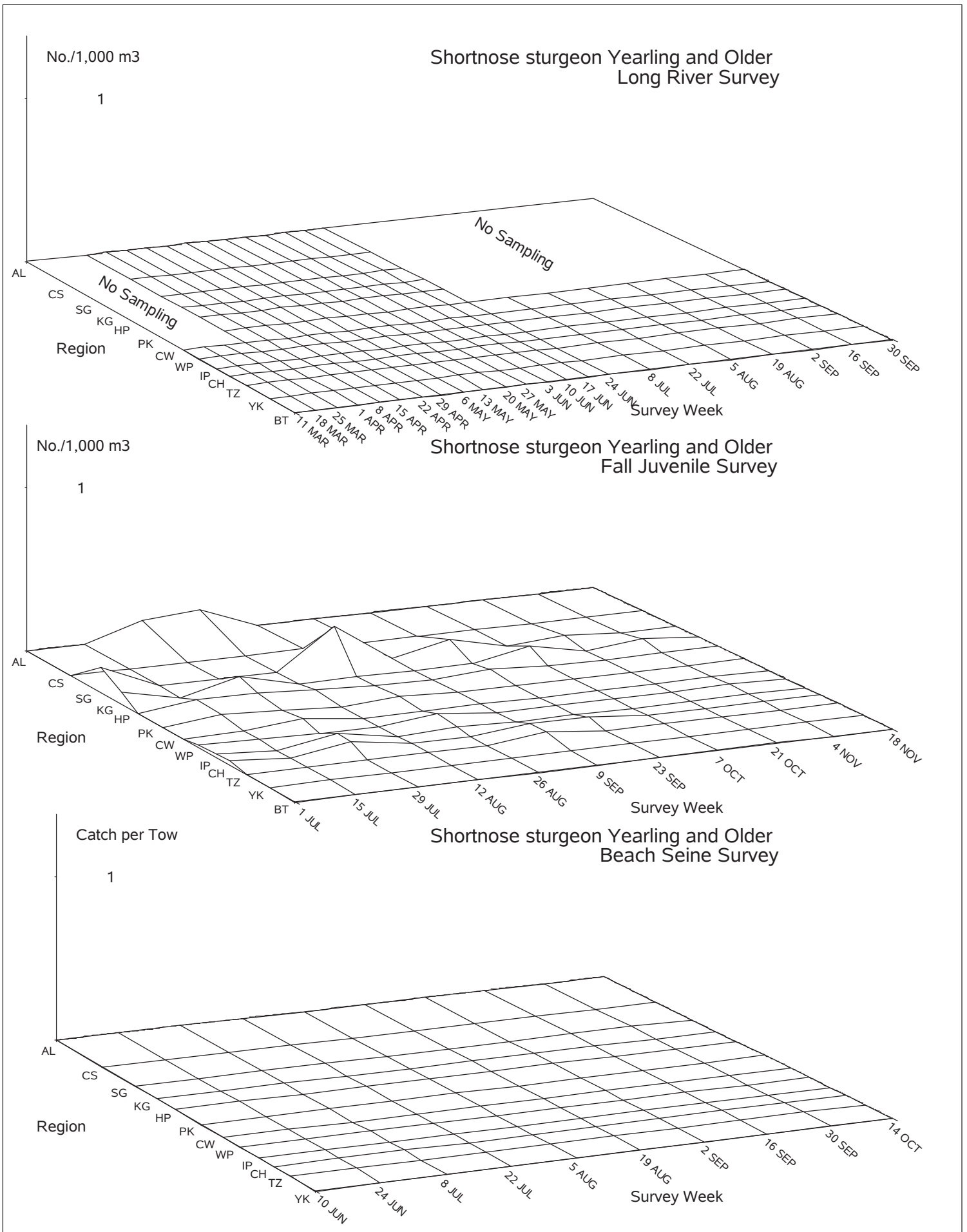


Figure 4-78. Spatiotemporal distribution of yearling and older shortnose sturgeon in the Hudson River estuary based on the 2013 Long River, Fall Juvenile, and Beach Seine surveys.

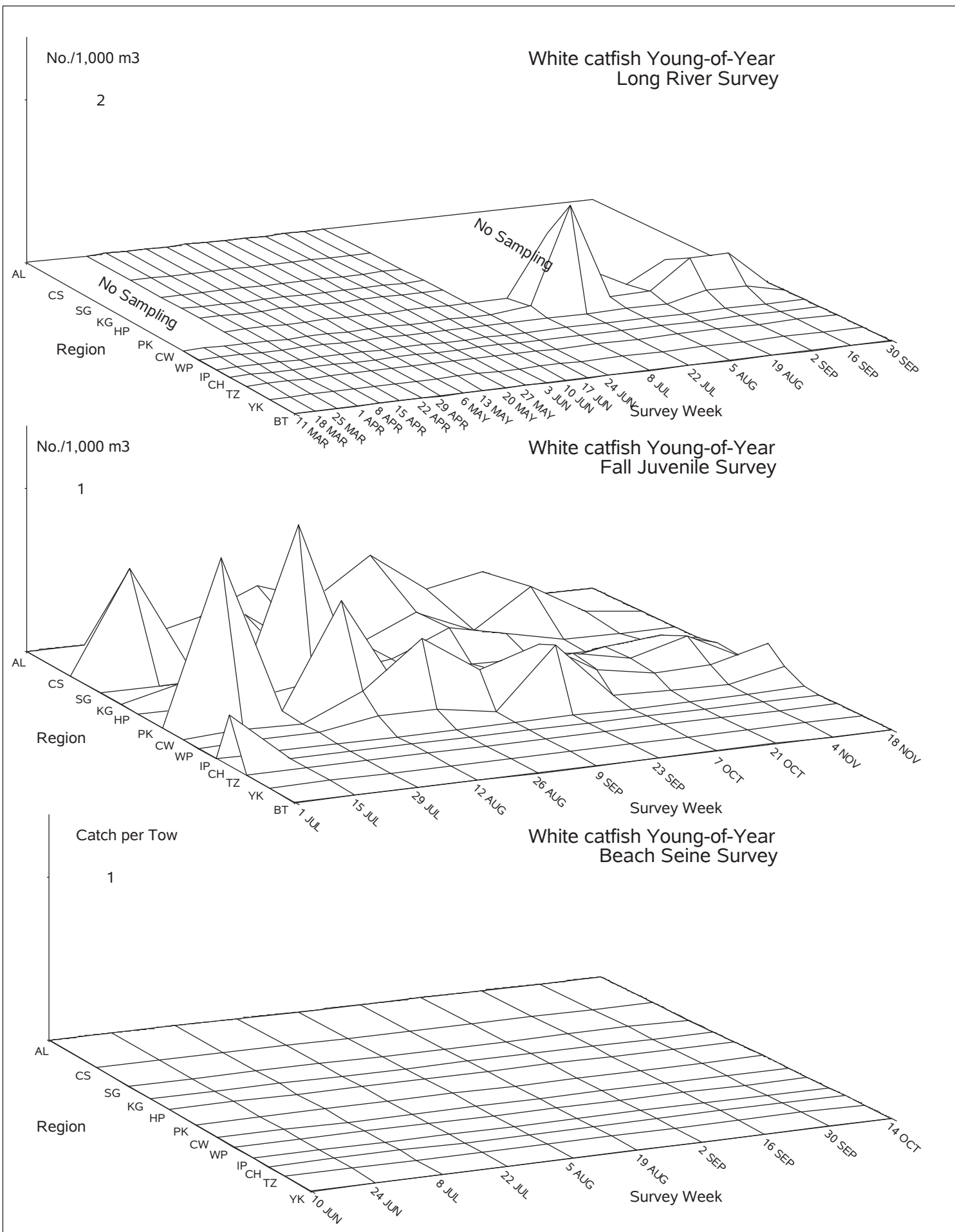


Figure 4-79. Spatiotemporal distribution of young-of-year white catfish in the Hudson River estuary based on the 2013 Long River, Fall Juvenile, and Beach Seine surveys.

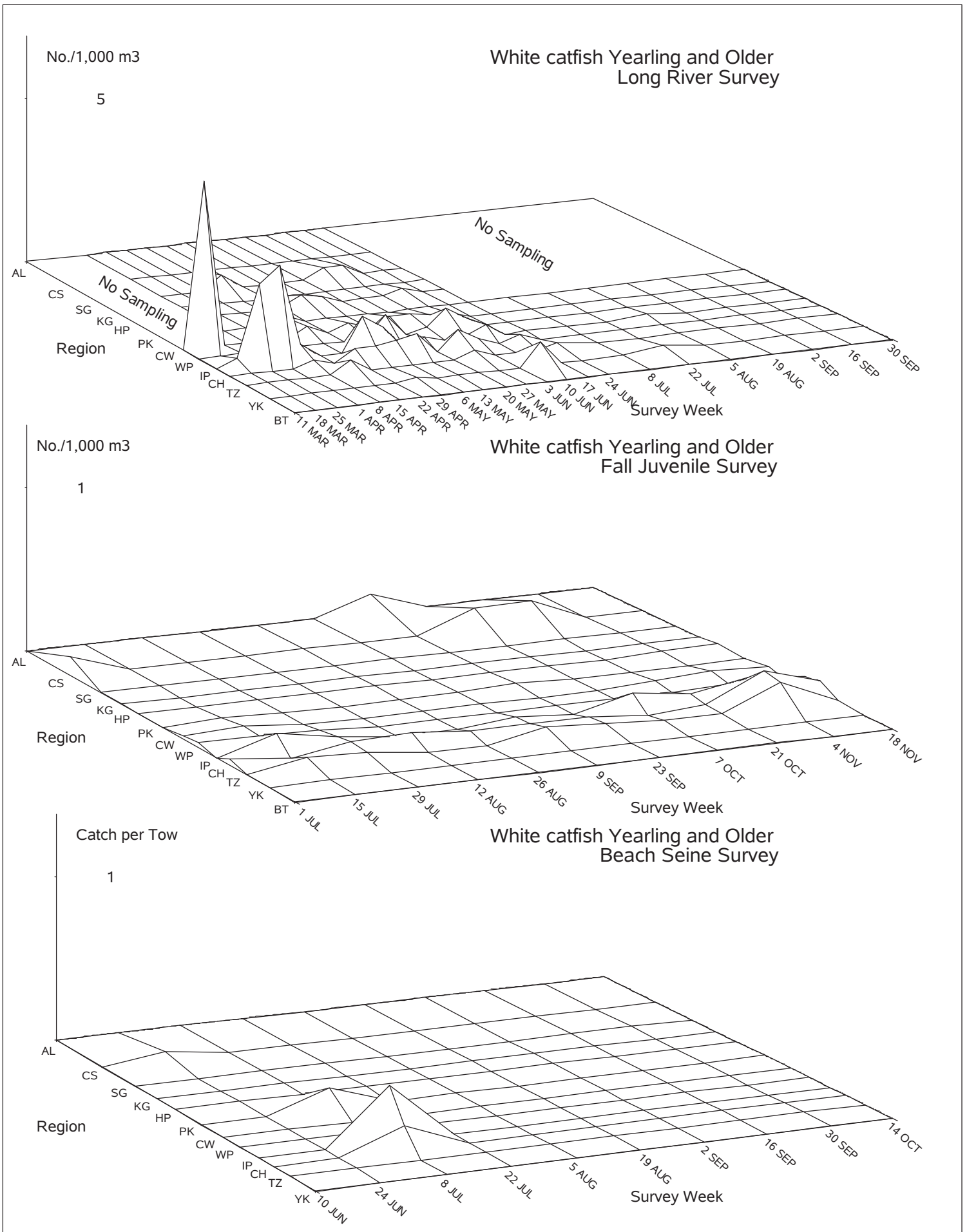


Figure 4-80. Spatiotemporal distribution of yearling and older white catfish in the Hudson River estuary based on the 2013 Long River, Fall Juvenile, and Beach Seine surveys.



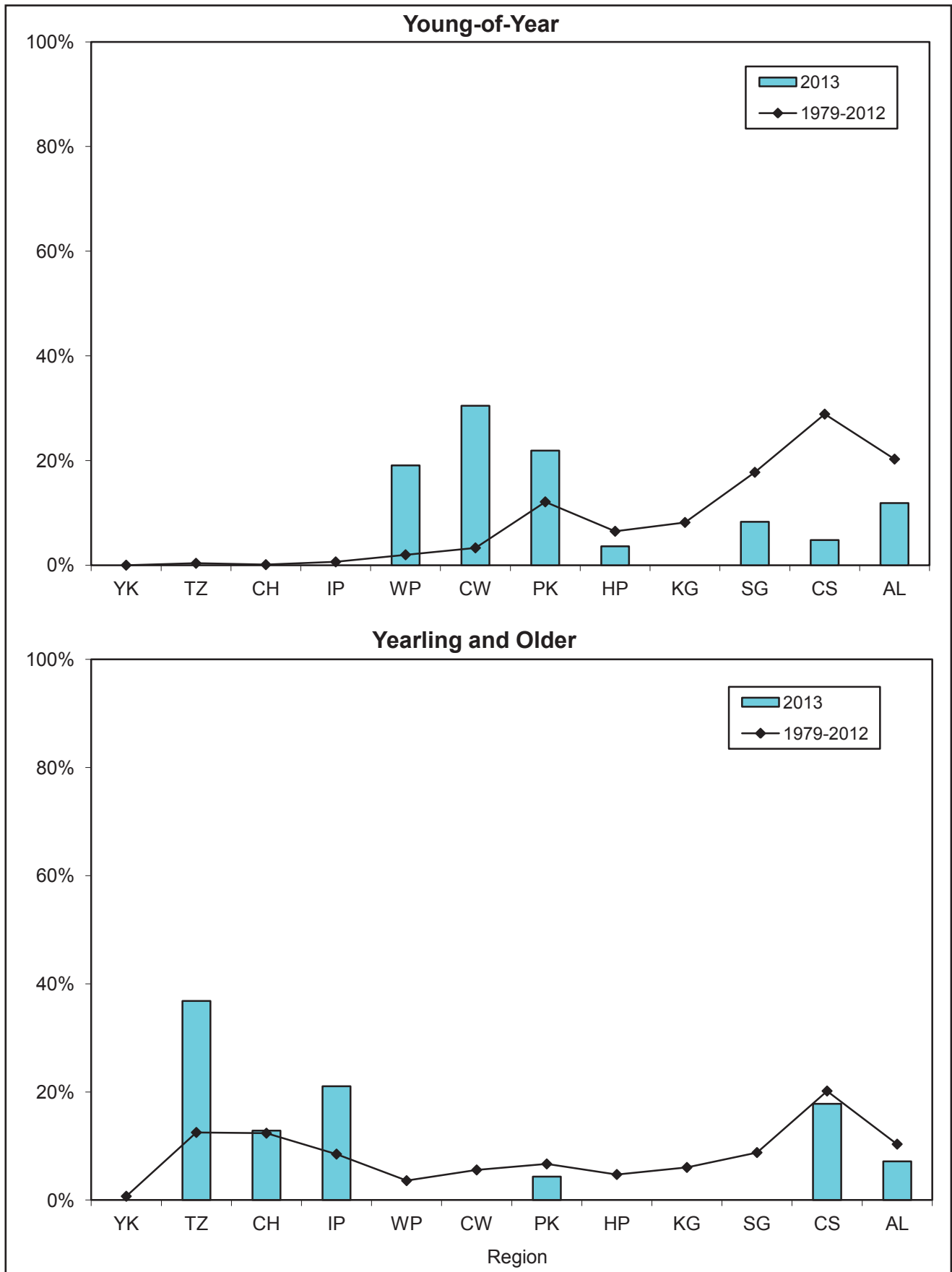


Figure 4-81. Geographic distribution indices for white catfish collected during Fall Juvenile surveys of the Hudson River estuary, 1979-2013.

# White catfish

Yearling and Older

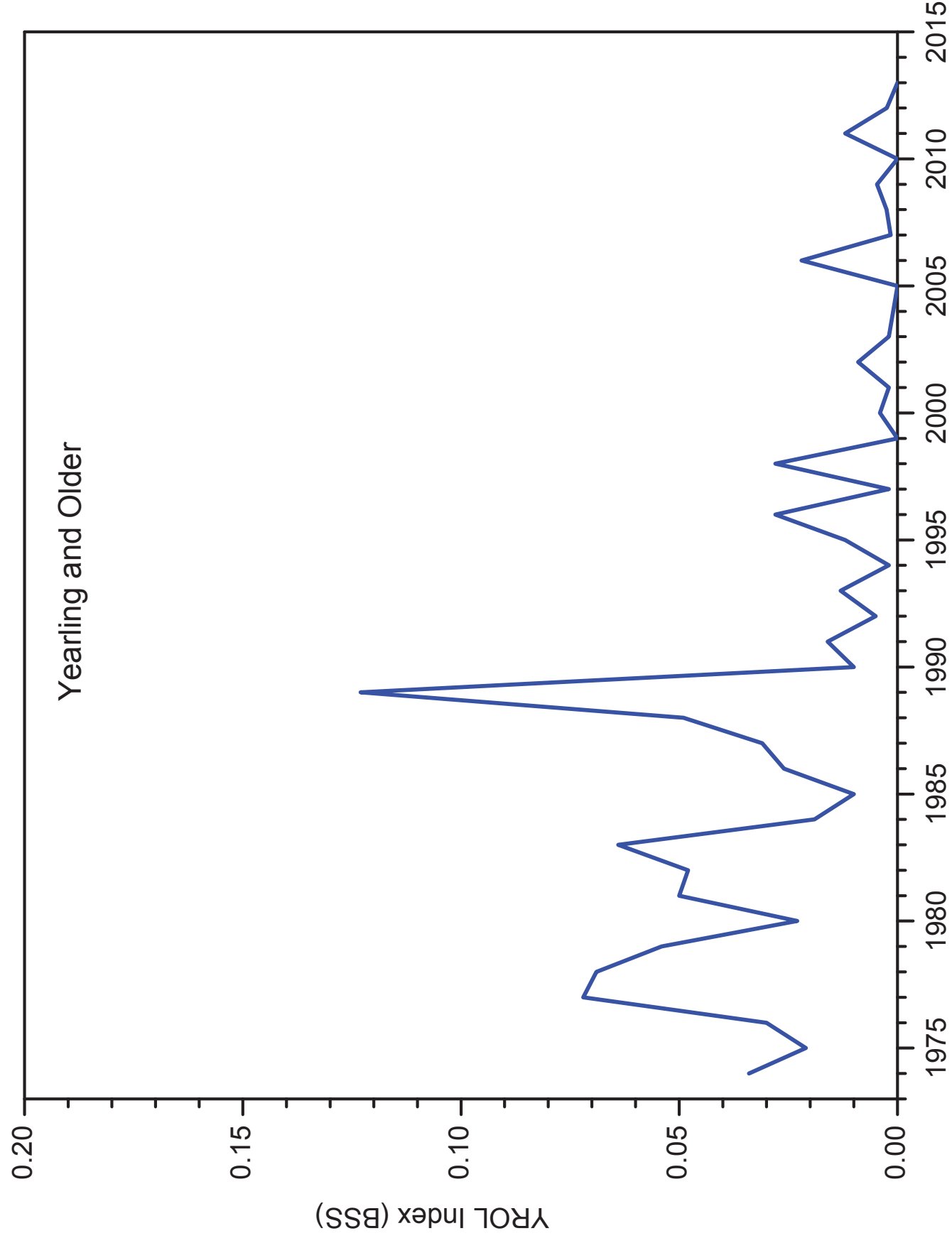


Figure 4-82. White catfish indices of annual abundance based on Beach Seine Survey, 1974-2013.

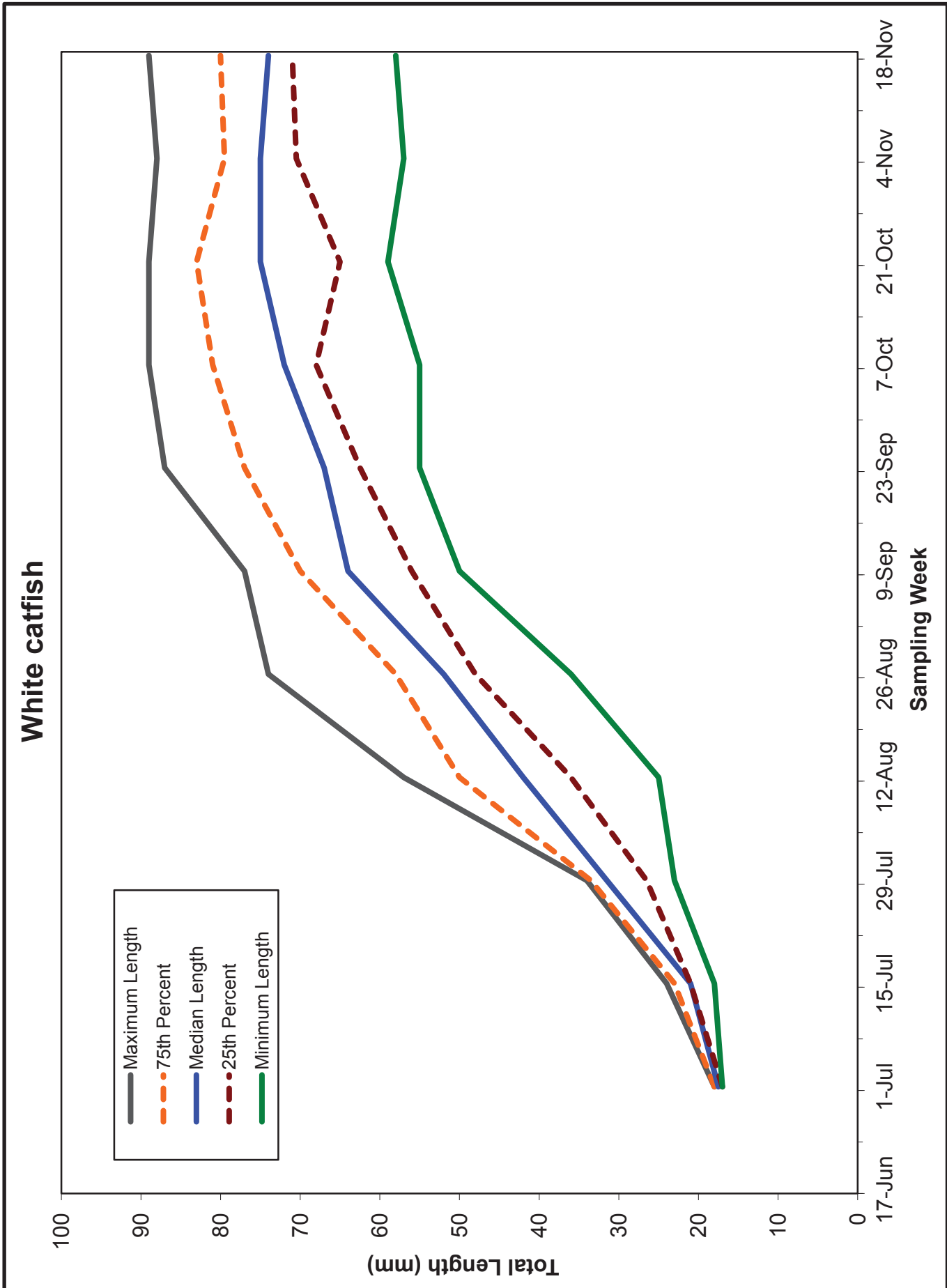


Figure 4-83. Weekly length statistics for young-of-year white catfish in the Hudson River estuary, 2013.

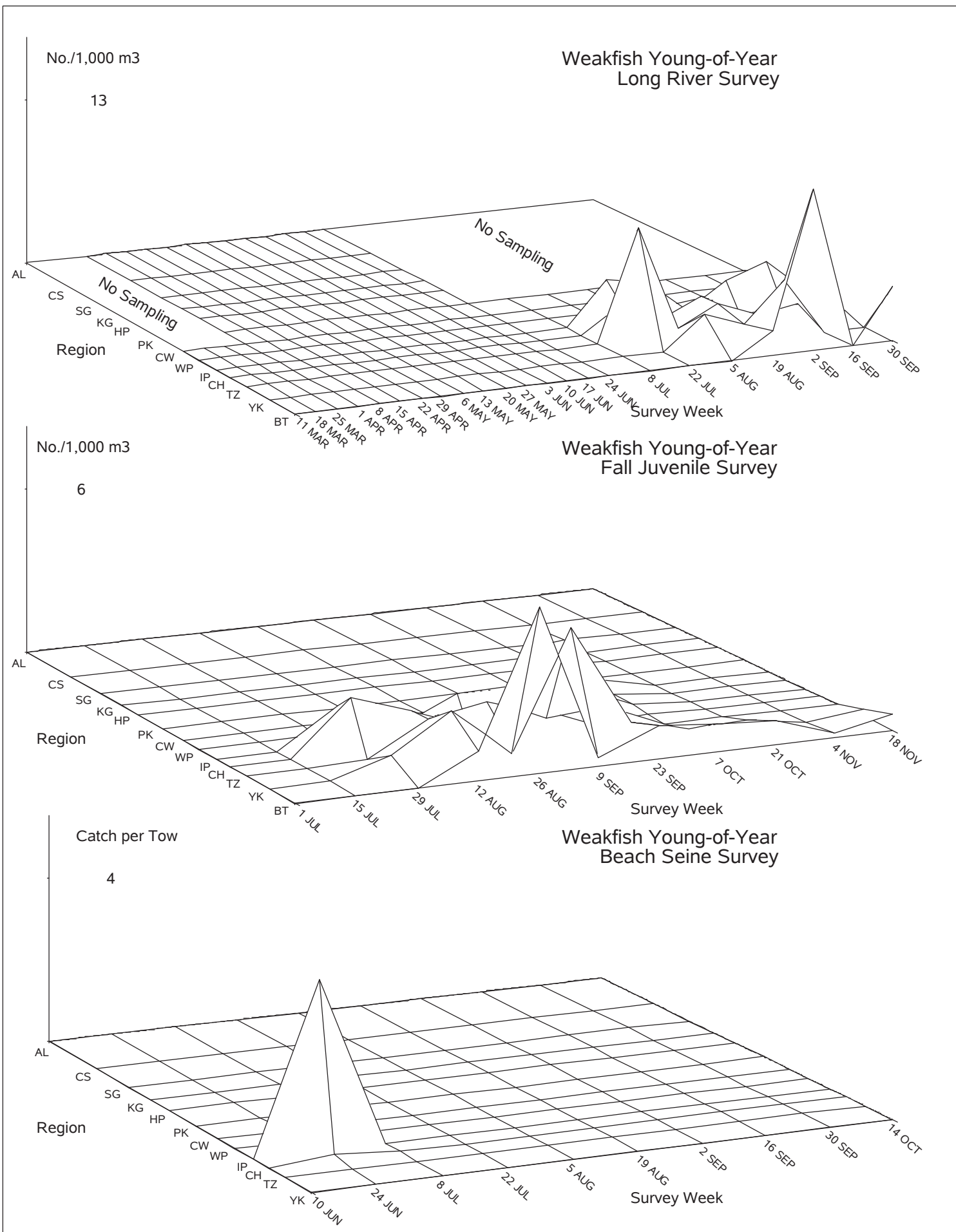


Figure 4-84. Spatiotemporal distribution of young-of-year weakfish in the Hudson River estuary based on the 2013 Long River, Fall Juvenile, and Beach Seine surveys.

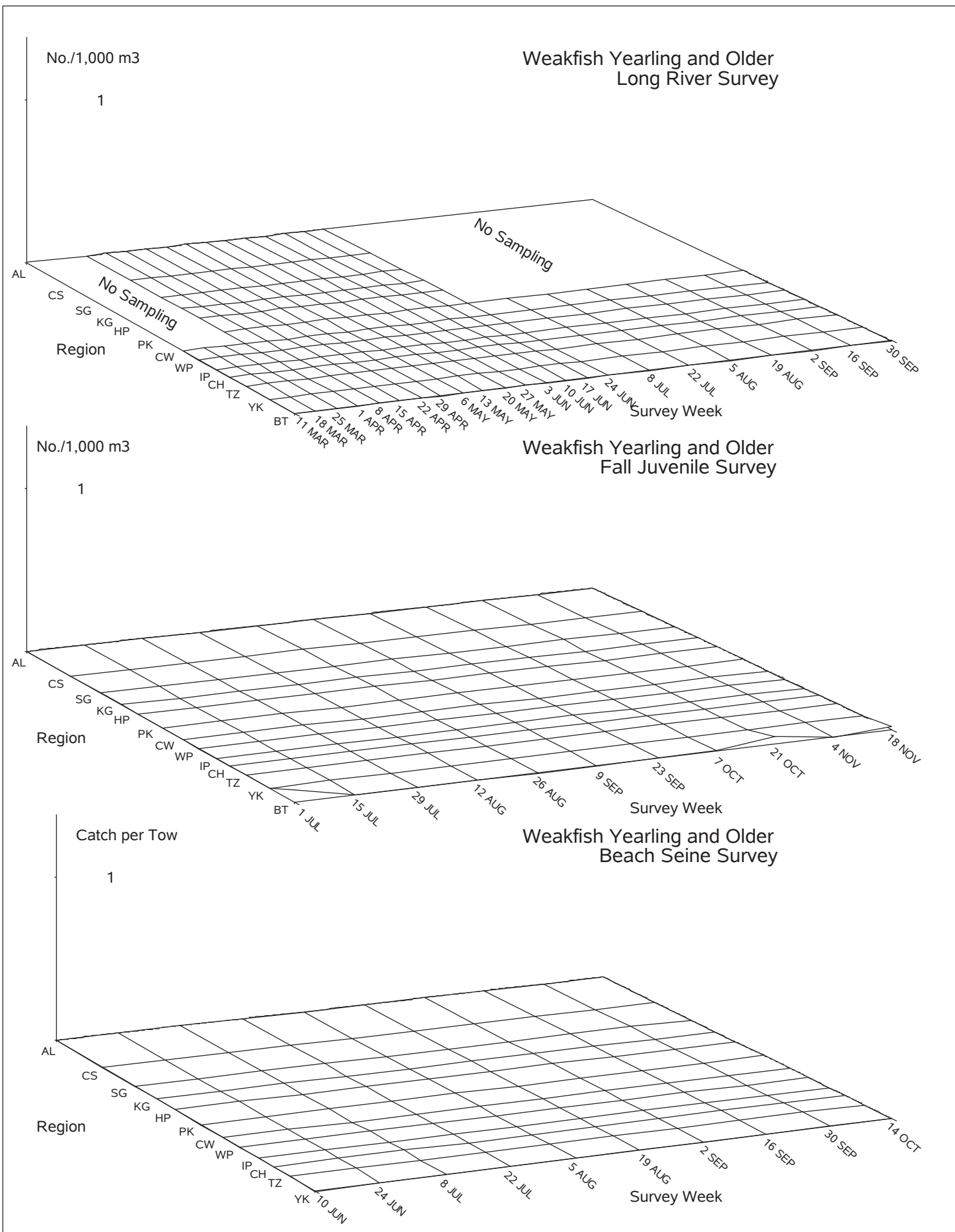


Figure 4-85. Spatiotemporal distribution of yearling and older weakfish in the Hudson River estuary based on the 2013 Long River, Fall Juvenile, and Beach Seine surveys.

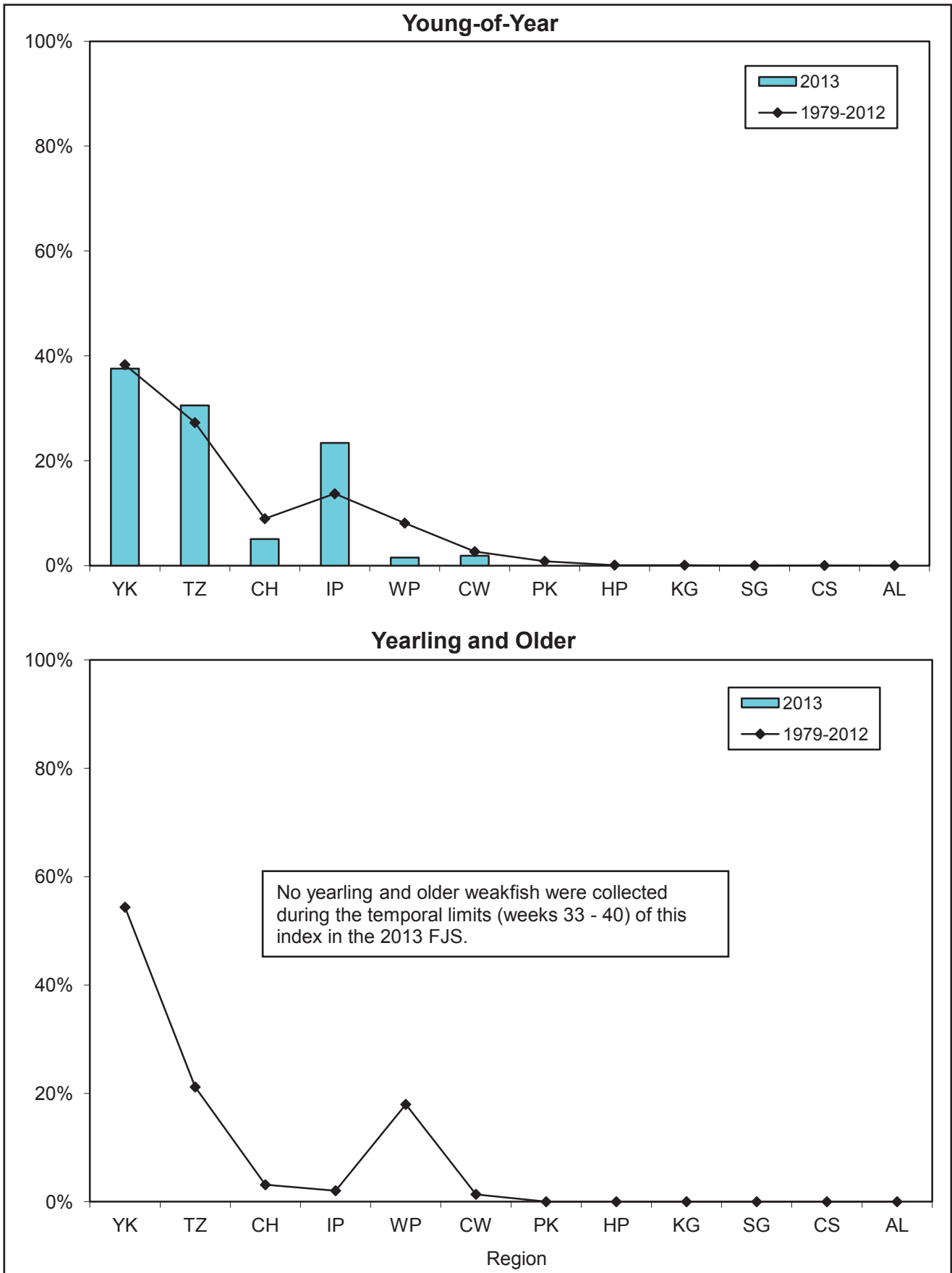


Figure 4-86. Geographic distribution indices for weakfish collected during Fall Juvenile surveys of the Hudson River estuary, 1979-2013.

# Weakfish

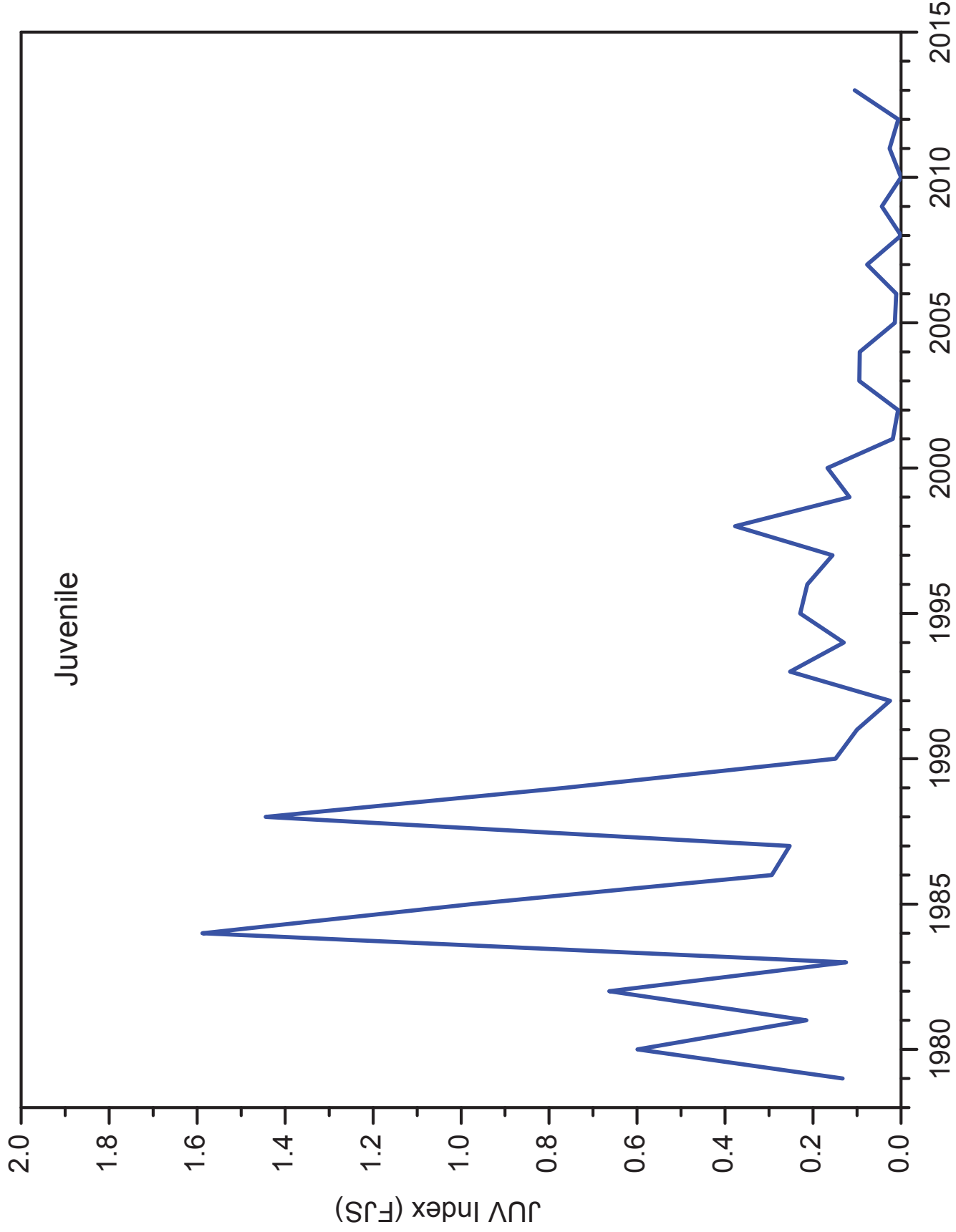


Figure 4-87. Weakfish indices of annual abundance based on Fall Juvenile Survey, 1979-2013.

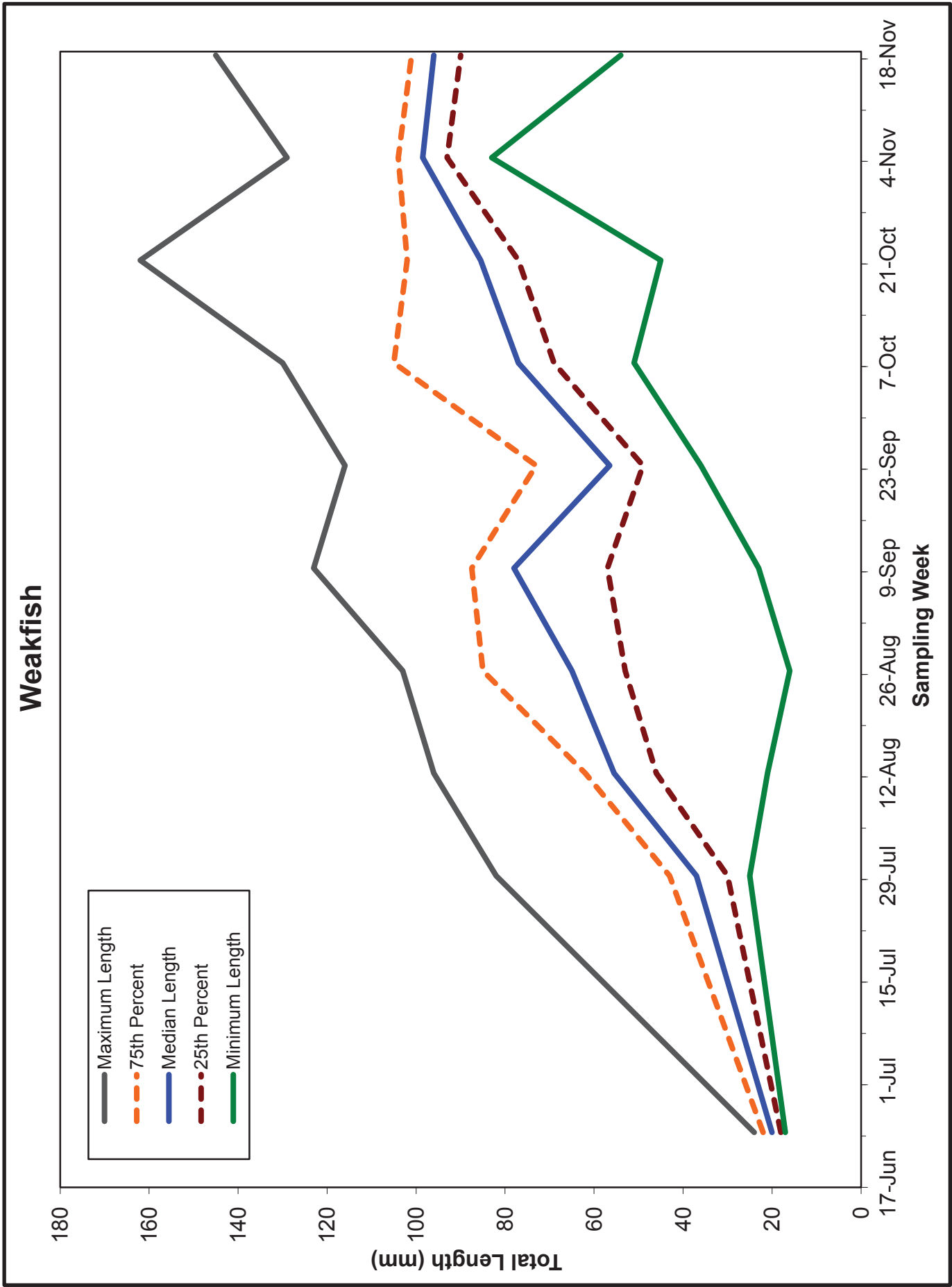


Figure 4-88. Weekly length statistics for young-of-year weakfish in the Hudson River estuary, 2013.



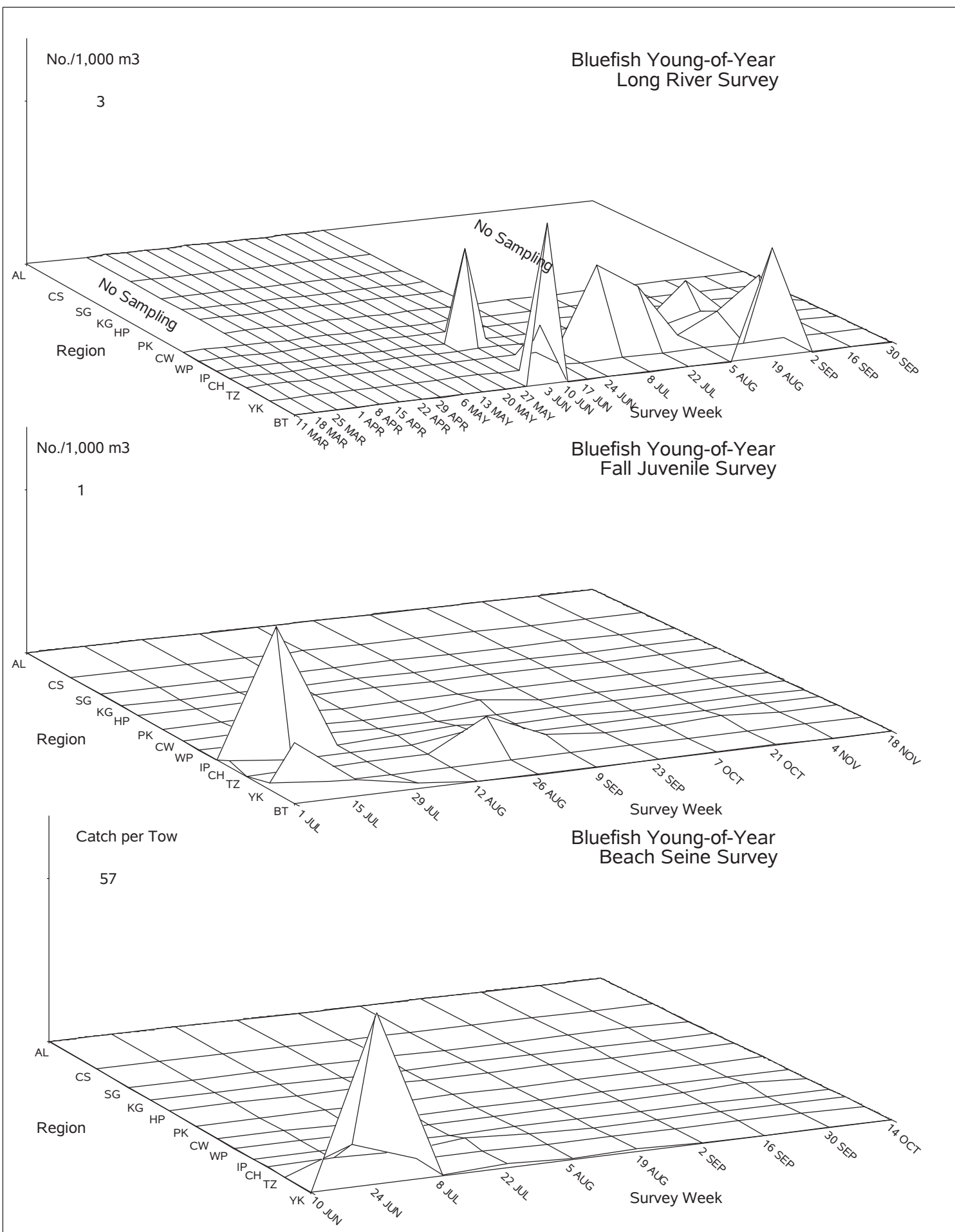


Figure 4-89. Spatiotemporal distribution of young-of-year bluefish in the Hudson River estuary based on the 2013 Long River, Fall Juvenile, and Beach Seine surveys.

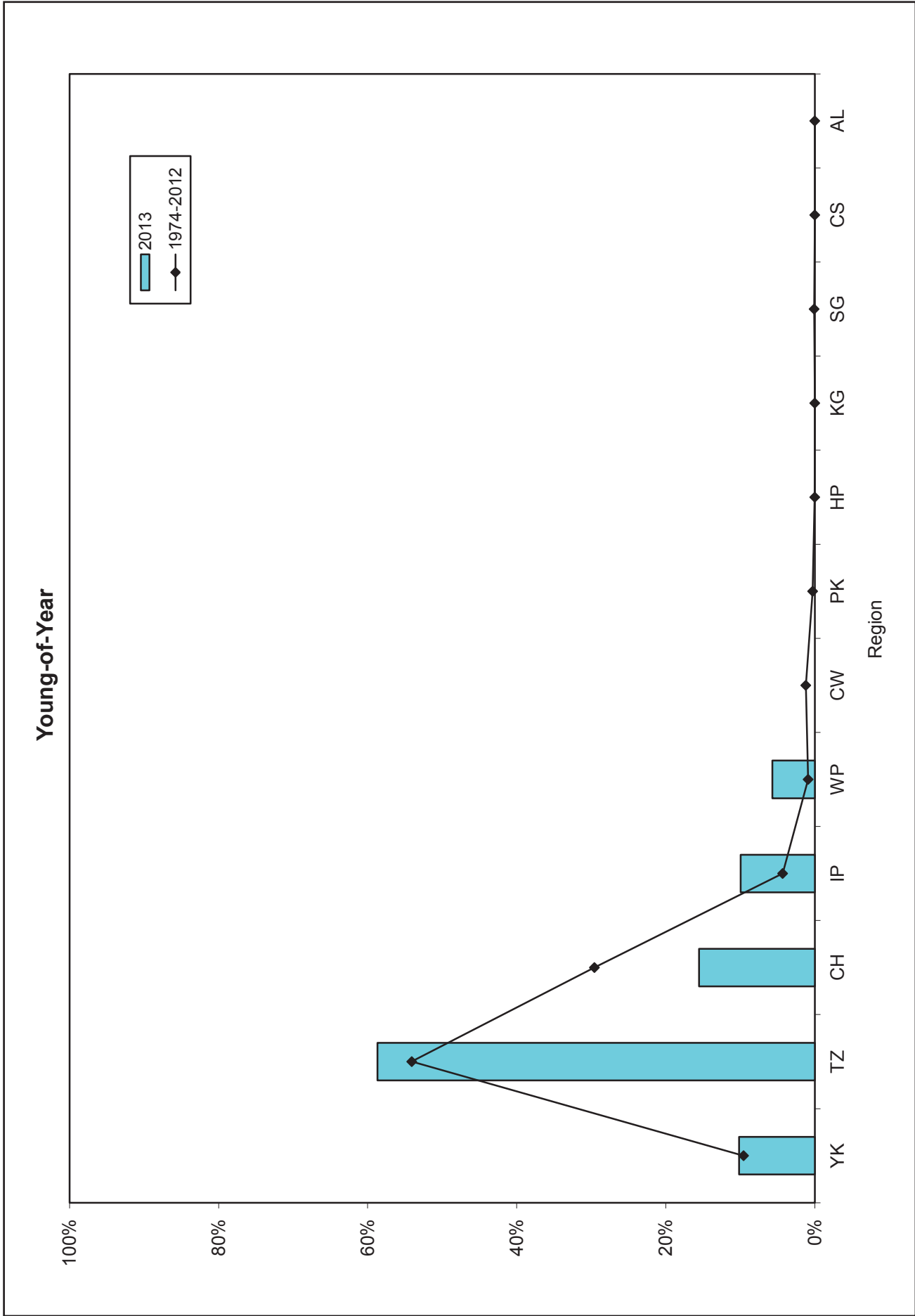


Figure 4-90. Geographic distribution indices for bluefish collected during Beach Seine surveys of the Hudson River estuary, 1974-2013.

# Bluefish

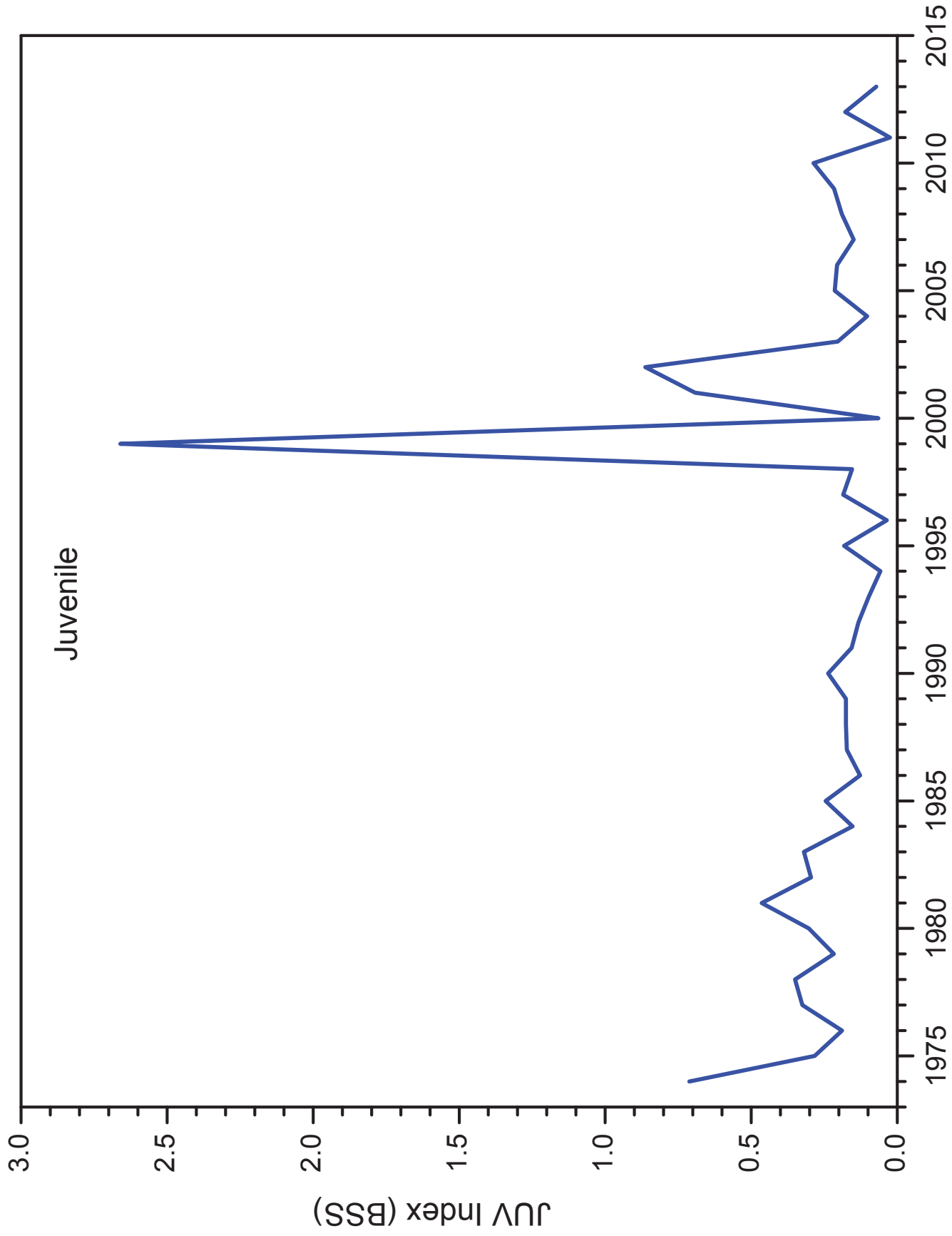


Figure 4-91. Bluefish indices of annual abundance based on Beach Seine Survey, 1974-2013.

Table 4-1 Species Composition of Fish Collected During Hudson River Studies from 1974 to 2013

| Common Name            | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 | 1983 | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 |    |
|------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|----|
| <b>Anadromous</b>      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |    |
| Alewife                | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X  |
| American shad          | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X  |
| Atlantic sturgeon      | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X  |
| Atlantic tomcod        | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X  |
| Blueback herring       | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X  |
| Hickory shad           | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X  |
| Rainbow smelt          | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X  |
| Sea lamprey            | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X  |
| Striped bass           | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X  |
| Total                  | 8    | 9    | 7    | 7    | 8    | 9    | 8    | 8    | 7    | 8    | 7    | 8    | 7    | 8    | 7    | 8    | 7    | 8    | 7    | 7    | 7    | 8    | 7    | 8    | 9    | 8    | 8  |
| <b>Catadromous</b>     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |    |
| American eel           | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X  |
| Total                  | 1    | 1    | 1    | 1    | 1    | 1    | 1    | 1    | 1    | 1    | 1    | 1    | 1    | 1    | 1    | 1    | 1    | 1    | 1    | 1    | 1    | 1    | 1    | 1    | 1    | 1    | 1  |
| <b>Estuarine</b>       |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |    |
| Atlantic silverside    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X  |
| Banded killifish       | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X  |
| Fat sleeper            | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X  |
| Fourspine stickleback  | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X  |
| Hogchoker              | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X  |
| Inland silverside      | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X  |
| Lined seahorse         | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X  |
| Mummichog              | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X  |
| Northern pipefish      | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X  |
| Shortnose sturgeon     | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X  |
| Threespine stickleback | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X  |
| White catfish          | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X  |
| White mullet           | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X  |
| White perch            | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X  |
| Total                  | 12   | 11   | 12   | 12   | 11   | 12   | 12   | 11   | 12   | 12   | 12   | 12   | 13   | 11   | 12   | 12   | 13   | 13   | 11   | 12   | 10   | 12   | 11   | 12   | 11   | 13   | 13 |
| <b>Freshwater</b>      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |    |
| Black bullhead         | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X  |
| Black crappie          | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X  |
| Blacknose dace         | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X  |
| Bluegill               | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X  |
| Bluntnose minnow       | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X  |
| Bride shiner           | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X  |
| Brook silverside       | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X  |
| Brook stickleback      | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X  |
| Brook trout            | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X  |

Table 4-1 (Continued)

| Common Name         | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 | 1983 | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 |  |
|---------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|--|
| Brown bullhead      | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    |  |
| Brown trout         |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |  |
| Carp                |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |  |
| Central mudminnow   |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |  |
| Chain pickerel      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |  |
| Channel catfish     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |  |
| Comely shiner       |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |  |
| Common shiner       |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |  |
| Creek chub          |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |  |
| Cutlips minnow      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |  |
| Eastern mudminnow   |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |  |
| Emerald shiner      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |  |
| Fallfish            |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |  |
| Fathead minnow      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |  |
| Freshwater drum     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |  |
| Gizzard shad        |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |  |
| Golden shiner       |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |  |
| Goldfish            |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |  |
| Grass carp          |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |  |
| Grass pickerel      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |  |
| Green sunfish       |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |  |
| Largemouth bass     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |  |
| Logperch            |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |  |
| Longear sunfish     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |  |
| Longnose dace       |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |  |
| Margined madtom     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |  |
| Mimic shiner        |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |  |
| Northern hog sucker |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |  |
| Northern pike       |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |  |
| Pugnose shiner      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |  |
| Pumpkinseed         |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |  |
| Rainbow trout       |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |  |
| Redbreast sunfish   |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |  |
| Redfin pickerel     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |  |
| Rock bass           |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |  |
| Rosyface shiner     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |  |
| Rudd                |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |  |
| Satinfin shiner     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |  |
| Shield darter       |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |  |
| Silvery minnow      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |  |
| Slimy sculpin       |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |  |
| Smallmouth bass     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |  |
| Spotfin shiner      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |  |
| Spottail shiner     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |  |
| Swallowtail shiner  |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |  |
| Tessellated darter  |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |  |
| Tiger muskellunge   |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |  |
| Trout perch         |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |  |
| Walleye             |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |  |
| White bass          |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |  |

Table 4-1 (Continued)

| Common Name              | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 | 1983 | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 |  |
|--------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|--|
| White crappie            | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    |  |
| White sucker             | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    |  |
| Yellow bullhead          | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    |  |
| Yellow perch             | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    |  |
| Total                    | 37   | 36   | 40   | 42   | 38   | 36   | 38   | 30   | 23   | 23   | 27   | 26   | 24   | 28   | 30   | 28   | 26   | 30   | 31   | 29   | 30   | 29   | 35   | 30   | 35   | 33   |  |
| <b>Marine</b>            |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |  |
| American sandlance       |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |  |
| Ammodytes sp.            | X    |      | X    |      | X    | X    | X    | X    |      |      | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    |  |
| Atlantic cod             |      |      |      | X    |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |  |
| Atlantic croaker         |      |      |      | X    |      | X    |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |  |
| Atlantic cutlassfish     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |  |
| Atlantic herring         |      |      |      |      | X    | X    |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |  |
| Atlantic mackerel        |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |  |
| Atlantic menhaden        | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    |  |
| Atlantic needlefish      | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    |  |
| Atlantic searail         |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |  |
| Bay anchovy              | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    |  |
| Black drum               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |  |
| Black seabass            |      |      |      |      | X    |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |  |
| Blackcheek<br>tonguefish |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |  |
| Bluefish                 | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    |  |
| Butterfish               | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    |  |
| Cobia                    |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |  |
| Conger eel               | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    |  |
| Crevalle jack            |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |  |
| Cunner                   | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    |  |
| Cusk                     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |  |
| Feather blenny           |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |  |
| Fourbeard rockling       |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |  |
| Fourspot flounder        | X    |      |      |      |      |      |      | X    |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |  |
| Goosefish                |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |  |
| Gray snapper             |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |  |
| Grubby                   |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |  |
| Gulf Stream flounder     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |  |
| Harvestfish              |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |  |
| Hightail goby            |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |  |
| Inshore lizardfish       | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    |  |
| Longhorn sculpin         | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    |  |
| Lookdown                 |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |  |
| Moonfish                 |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |  |
| Naked goby               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |  |
| Northern kingfish        | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    |  |
| Northern puffer          | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    |  |
| Northern searobin        |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |  |
| Northern stargazer       | X    |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |  |

Table 4-1 (Continued)

| Common Name            | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 | 1983 | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 |     |
|------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|-----|
| Orangespotted filefish |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |     |
| Oyster toadfish        |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |     |
| Permit                 |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |     |
| Pigfish                |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |     |
| Pinfish                |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |     |
| Pollack                |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |     |
| Radiated shanny        |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |     |
| Red hake               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |     |
| Rock gunnel            |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |     |
| Rough silverside       |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |     |
| Scup                   |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |     |
| Seaboard goby          |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |     |
| Sea raven              |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |     |
| Sheepshead minnow      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |     |
| Silver anchovy         |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |     |
| Silver hake            |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |     |
| Silver perch           |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |     |
| Skillifish             |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |     |
| Smallmouth flounder    |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |     |
| Spanish mackerel       |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |     |
| Speckled worm eel      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |     |
| Spot                   |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |     |
| Spotfin butterflyfish  |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |     |
| Spotfin mojarra        |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |     |
| Spotted goatfish       |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |     |
| Spotted hake           |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |     |
| Striped anchovy        |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |     |
| Striped burrfish       |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |     |
| Striped cuskeel        |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |     |
| Striped killifish      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |     |
| Striped mullet         |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |     |
| Striped searobin       |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |     |
| Summer flounder        |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |     |
| Tautog                 |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |     |
| Weakfish               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |     |
| Windowpane             |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |     |
| Winter flounder        |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |     |
| Witch flounder         |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |     |
| Yellowtail flounder    |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |     |
| Total                  | 24   | 24   | 24   | 20   | 16   | 74   | 84   | 92   | 33   | 24   | 25   | 20   | 28   | 35   | 29   | 41   | 34   | 35   | 38   | 42   | 37   | 37   | 39   | 39   | 40   | 45   | 49  |
| <b>All Categories</b>  | 82   | 81   | 84   | 82   | 74   | 84   | 92   | 74   | 68   | 64   | 76   | 81   | 81   | 81   | 76   | 92   | 82   | 83   | 89   | 92   | 86   | 85   | 89   | 93   | 91   | 101  | 104 |

Table 4-1 (Continued)

| Common Name            | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 |
|------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| <b>Anadromous</b>      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Alewife                | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    |
| American shad          | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    |
| Atlantic sturgeon      | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    |
| Atlantic tomcod        | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    |
| Blueback herring       | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    |
| Hickory shad           | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    |
| Rainbow smelt          | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    |
| Sea lamprey            | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    |
| Striped bass           | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    |
| Total                  | 7    | 7    | 7    | 6    | 6    | 7    | 8    | 8    | 7    | 6    | 8    | 7    | 7    | 8    |
| <b>Catadromous</b>     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| American eel           | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    |
| Total                  | 1    | 1    | 1    | 1    | 1    | 1    | 1    | 1    | 1    | 1    | 1    | 1    | 1    | 1    |
| <b>Estuarine</b>       |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Atlantic silverside    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    |
| Banded killifish       | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    |
| Fat sleeper            | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    |
| Fourspine stickleback  | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    |
| Hogchoker              | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    |
| Inland silverside      | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    |
| Lined seahorse         | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    |
| Mummichog              | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    |
| Northern pipefish      | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    |
| Shortnose sturgeon     | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    |
| Threespine stickleback | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    |
| White catfish          | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    |
| White mullet           | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    |
| White perch            | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    |
| Total                  | 11   | 12   | 13   | 12   | 10   | 11   | 12   | 12   | 11   | 12   | 11   | 11   | 12   | 11   |
| <b>Freshwater</b>      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Black bullhead         | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    |
| Black crappie          | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    |
| Blacknose dace         | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    |
| Bluegill               | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    |
| Bluntnose minnow       | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    |
| Bride shiner           | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    |
| Brook silverside       | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    |
| Brook stickleback      | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    |
| Brook trout            | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    |
| Brown bullhead         | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    |
| Brown trout            | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    |
| Carp                   | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    |
| Central mudminnow      | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    |
| Chain pickerel         | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    |



Table 4-1 (Continued)

| Common Name         | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 |
|---------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Channel catfish     | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    |
| Comely shiner       |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Common shiner       | X    | X    |      | X    |      |      |      |      | X    |      |      |      | X    | X    |
| Creek chub          |      |      |      | X    |      |      |      |      |      |      |      |      |      |      |
| Cutlips minnow      |      |      |      |      |      |      |      | X    |      |      |      |      |      |      |
| Eastern mudminnow   |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Emerald shiner      | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    |
| Fallfish            | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    |
| Fathead minnow      | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    |
| Freshwater drum     | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    |
| Gizzard shad        | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    |
| Golden shiner       | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    |
| Goldfish            | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    |
| Grass carp          |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Grass pickerel      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Green sunfish       |      |      |      | X    |      |      |      |      |      |      |      |      |      |      |
| Largemouth bass     | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    |
| Logperch            |      |      |      | X    |      |      |      |      |      |      |      |      |      |      |
| Longear sunfish     |      |      |      | X    |      |      |      | X    |      |      |      |      |      |      |
| Longnose dace       |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Margined madtom     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Mimic shiner        |      |      |      |      |      |      |      |      |      |      | X    |      |      |      |
| Northern hog sucker | X    | X    | X    | X    | X    |      |      | X    | X    |      |      |      | X    | X    |
| Northern pike       | X    | X    | X    | X    | X    | X    |      | X    | X    |      | X    |      |      |      |
| Pugnose shiner      | X    | X    | X    | X    | X    | X    |      | X    | X    |      | X    |      | X    | X    |
| Pumpkinseed         | X    | X    | X    | X    | X    | X    |      | X    | X    |      | X    |      | X    | X    |
| Rainbow trout       | X    | X    | X    | X    | X    | X    |      | X    | X    |      | X    |      | X    | X    |
| Redbreast sunfish   | X    | X    | X    | X    | X    | X    |      | X    | X    |      | X    |      | X    | X    |
| Redfin pickerel     | X    | X    | X    | X    | X    | X    |      | X    | X    |      | X    |      | X    | X    |
| Rock bass           | X    | X    | X    | X    | X    | X    |      | X    | X    |      | X    |      | X    | X    |
| Rosyface shiner     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Rudd                |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Satinfin shiner     |      | X    | X    | X    | X    | X    |      | X    | X    |      | X    |      | X    | X    |
| Shield darter       |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Silvery minnow      | X    | X    | X    | X    | X    | X    |      | X    | X    |      | X    |      | X    | X    |
| Slimy sculpin       |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Smallmouth bass     | X    | X    | X    | X    | X    | X    |      | X    | X    |      | X    |      | X    | X    |
| Spottail shiner     | X    | X    | X    | X    | X    | X    |      | X    | X    |      | X    |      | X    | X    |
| Spottail shiner     | X    | X    | X    | X    | X    | X    |      | X    | X    |      | X    |      | X    | X    |
| Swallowtail shiner  | X    | X    | X    | X    | X    | X    |      | X    | X    |      | X    |      | X    | X    |
| Tessellated darter  | X    | X    | X    | X    | X    | X    |      | X    | X    |      | X    |      | X    | X    |
| Tiger muskellunge   |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Trout perch         |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Walleye             | X    | X    | X    | X    | X    | X    |      | X    | X    |      | X    |      | X    | X    |
| White bass          |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| White crappie       | X    | X    | X    | X    | X    | X    |      | X    | X    |      | X    |      | X    | X    |
| White sucker        |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Yellow bullhead     | X    | X    | X    | X    | X    | X    |      | X    | X    |      | X    |      | X    | X    |
| Yellow perch        | X    | X    | X    | X    | X    | X    |      | X    | X    |      | X    |      | X    | X    |
| Total               | 29   | 27   | 28   | 35   | 35   | 28   | 28   | 28   | 34   | 34   | 31   | 33   | 27   | 30   |

Table 4-1 (Continued)

| Common Name            | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 |
|------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| <b>Marine</b>          |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| American sandlance     | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    |
| Ammodytes sp.          |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Atlantic cod           | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    |
| Atlantic croaker       | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    |
| Atlantic cutlassfish   | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    |
| Atlantic herring       | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    |
| Atlantic mackerel      | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    |
| Atlantic menhaden      | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    |
| Atlantic needlefish    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    |
| Atlantic seasnail      | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    |
| Bay anchovy            | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    |
| Black drum             |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Black seabass          |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Blackcheek tonguefish  |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Bluefish               | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    |
| Butterfish             | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    |
| Cobia                  | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    |
| Conger eel             | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    |
| Crevalle jack          | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    |
| Cunner                 | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    |
| Cusk                   | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    |
| Feather blenny         | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    |
| Fourbeard rockling     | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    |
| Fourspot flounder      | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    |
| Goosefish              |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Gray snapper           | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    |
| Grubby                 |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Gulf Stream flounder   | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    |
| Harvestfish            |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Hightail goby          |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Inshore lizardfish     | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    |
| Longhorn sculpin       |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Lookdown               | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    |
| Moonfish               | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    |
| Naked goby             | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    |
| Northern kingfish      | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    |
| Northern puffer        | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    |
| Northern searobin      | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    |
| Northern stargazer     | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    |
| Orangespotted filefish | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    |
| Oyster toadfish        | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    |
| Permit                 | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    |
| Pigfish                |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Pinfish                |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Pollack                |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Radiated shanny        |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Red hake               | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    |

Table 4-1 (Continued)

| Common Name           | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 |
|-----------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Rock gunnel           | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    |
| Rough silverside      | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    |
| Scup                  | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    |
| Seaboard goby         | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    |
| Sea raven             |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Sheepshead minnow     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Silver anchovy        |      |      |      |      |      |      |      |      |      | X    |      |      |      |      |
| Silver hake           | X    | X    | X    |      | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    |
| Silver perch          | X    | X    | X    |      | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    |
| Skilletfish           |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Smallmouth flounder   | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    |
| Spanish mackerel      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Speckled worm eel     | X    | X    | X    |      | X    |      |      |      |      |      |      | X    |      | X    |
| Spot                  | X    | X    | X    |      | X    |      |      |      | X    | X    | X    | X    |      | X    |
| Spotfin butterflyfish |      |      |      |      |      |      |      |      |      | X    |      |      |      |      |
| Spotfin mojarra       |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Spotted goatfish      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Spotted hake          | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    |
| Striped anchovy       | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    |
| Striped burrfish      |      |      |      |      |      | X    |      |      |      |      |      |      |      |      |
| Striped cuskeel       | X    | X    |      | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    |
| Striped killifish     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Striped mullet        | X    | X    | X    |      | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    |
| Striped searobin      | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    |
| Summer flounder       | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    |
| Tautog                | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    |
| Weakfish              | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    |
| Winduppane            | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    |
| Winter flounder       | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    |
| Witch flounder        |      |      |      |      |      |      |      |      |      | X    |      |      |      |      |
| Yellowtail flounder   | X    | X    | X    |      | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    |
| Total                 | 46   | 43   | 44   | 39   | 40   | 42   | 40   | 40   | 43   | 45   | 38   | 46   | 43   | 49   |
| <b>All Categories</b> |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Total                 | 94   | 90   | 93   | 93   | 92   | 90   | 89   | 89   | 98   | 98   | 88   | 99   | 90   | 99   |

Table 4-2 Species Composition of Fish Collected in Each of the Hudson River Surveys During 2013

| <u>Common Name</u>        | <u>BSS</u> | <u>FSS</u> | <u>LRS</u> |
|---------------------------|------------|------------|------------|
| <b><u>Anadromous</u></b>  |            |            |            |
| Alewife                   | X          | X          | X          |
| American shad             | X          | X          | X          |
| Atlantic sturgeon         |            | X          | X          |
| Atlantic tomcod           |            | X          | X          |
| Blueback herring          | X          | X          | X          |
| Hickory shad              | X          |            |            |
| Rainbow smelt             |            |            | X          |
| Striped bass              | X          | X          | X          |
| Total                     | 5          | 6          | 7          |
| <b><u>Catadromous</u></b> |            |            |            |
| American eel              | X          | X          | X          |
| Total                     | 1          | 1          | 1          |
| <b><u>Estuarine</u></b>   |            |            |            |
| Atlantic silverside       | X          | X          | X          |
| Banded killifish          | X          |            | X          |
| Hogchoker                 | X          | X          | X          |
| Inland silverside         | X          |            | X          |
| Lined sea horse           |            |            | X          |
| Mummichog                 | X          |            | X          |
| Northern pipefish         | X          | X          | X          |
| Shortnose sturgeon        |            | X          | X          |
| White catfish             | X          | X          | X          |
| White perch               | X          | X          | X          |
| Total                     | 9          | 7          | 11         |
| <b><u>Freshwater</u></b>  |            |            |            |
| Black crappie             | X          |            | X          |
| Bluegill                  | X          |            | X          |
| Brook silverside          | X          |            |            |
| Brown bullhead            | X          | X          | X          |
| Carp                      | X          | X          | X          |
| Channel catfish           | X          | X          | X          |
| Emerald shiner            | X          |            |            |
| Fall fish                 | X          |            | X          |
| Fathead minnow            | X          |            |            |
| Freshwater drum           | X          | X          | X          |
| Gizzard shad              | X          | X          | X          |
| Golden shiner             | X          |            |            |
| Goldfish                  | X          |            |            |
| Largemouth bass           | X          |            | X          |
| Logperch                  | X          |            | X          |
| (Continued)               |            |            |            |

Table 4-2 (Continued)

| <u>Common name</u>                   | <u>BSS</u> | <u>FSS</u> | <u>LRS</u> |
|--------------------------------------|------------|------------|------------|
| <b><u>Freshwater (continued)</u></b> |            |            |            |
| Northern hog sucker                  | X          |            |            |
| Northern pike                        | X          |            |            |
| Pumpkinseed                          | X          | X          |            |
| Redbreast sunfish                    | X          |            |            |
| Redfin pickerel                      | X          |            |            |
| Satinfin shiner                      | X          |            |            |
| Silvery minnow                       | X          |            |            |
| Smallmouth bass                      | X          |            | X          |
| Spotfin shiner                       | X          |            |            |
| Spottail shiner                      | X          | X          | X          |
| Tesselated darter                    | X          | X          | X          |
| Walleye                              | X          |            | X          |
| White sucker                         | X          |            | X          |
| Yellow perch                         | X          |            | X          |
| Total                                | 30         | 8          | 16         |
| <b><u>Marine</u></b>                 |            |            |            |
| American sand lance                  |            |            | X          |
| Atlantic cod                         |            |            | X          |
| Atlantic croaker                     | X          | X          | X          |
| Atlantic herring                     |            |            | X          |
| Atlantic mackerel                    |            | X          | X          |
| Atlantic menhaden                    | X          | X          | X          |
| Atlantic needlefish                  | X          | X          | X          |
| Bay anchovy                          | X          | X          | X          |
| Black sea bass                       |            |            | X          |
| Bluefish                             | X          | X          | X          |
| Butterfish                           | X          | X          | X          |
| Conger eel                           |            |            | X          |
| Crevalle jack                        |            | X          |            |
| Cunner                               |            |            | X          |
| Feather blenny                       |            |            | X          |
| Fourbeard rockling                   |            |            | X          |
| Fourspot flounder                    |            |            | X          |
| Goosefish                            |            |            | X          |
| Grubby                               |            |            | X          |
| Inshore lizardfish                   | X          |            |            |
| Longhorn sculpin                     |            |            | X          |
| Naked goby                           | X          | X          | X          |
| Northern kingfish                    | X          | X          |            |
| Northern searobin                    |            | X          | X          |
| Northern stargazer                   |            | X          |            |
| Oyster toadfish                      |            | X          | X          |
| Pinfish                              | X          |            |            |
| Pollack                              |            |            | X          |
| Rock gunnel                          |            | X          | X          |
| Rough silverside                     |            |            | X          |
| Seaboard goby                        |            |            | X          |
| (Continued)                          |            |            |            |

Table 4-2 (Continued)

| <u>Common name</u>               | <u>BSS</u> | <u>FSS</u> | <u>LRS</u> |
|----------------------------------|------------|------------|------------|
| <b><u>Marine (continued)</u></b> |            |            |            |
| Silver hake                      |            | X          |            |
| Silver perch                     |            | X          |            |
| Skilletfish                      |            |            | X          |
| Smallmouth flounder              |            | X          | X          |
| Spot                             | X          | X          | X          |
| Spotted hake                     |            | X          | X          |
| Striped anchovy                  | X          | X          | X          |
| Striped cuskeel                  |            | X          | X          |
| Striped mullet                   | X          |            |            |
| Striped searobin                 |            | X          | X          |
| Summer flounder                  | X          | X          | X          |
| Tautog                           |            |            | X          |
| Weakfish                         | X          | X          | X          |
| Windowpane                       |            | X          | X          |
| Winter flounder                  | X          | X          | X          |
| Witch flounder                   |            |            | X          |
| Yellowtail flounder              |            |            | X          |
| Total                            | 16         | 27         | 41         |
| <b><u>Undetermined</u></b>       |            |            |            |
| Acipenseridae                    |            | X          | X          |
| Alosa spp.                       | X          | X          | X          |
| Centrarchidae                    | X          | X          | X          |
| Cyprinidae                       | X          |            |            |
| Gadidae                          |            |            | X          |
| Gobiidae                         |            |            | X          |
| Menidia spp.                     |            |            | X          |
| Morone unidentified              |            |            | X          |
| Pleuronectidae                   |            |            | X          |
| Searobin                         |            |            | X          |
| Unidentified lamprey             |            |            | X          |
| Unidentifiable                   |            |            | X          |
| Total                            | 3          | 3          | 12         |

Table 4-3 Collections Of Atlantic Sturgeon During The 2013 Hudson River Surveys

| <u>Date</u> | <u>Survey</u> | <u>Region</u>     | <u>River<br/>Mile</u> | <u>Gear</u>         | <u>Number<br/>Collected</u> | <u>Total Length (mm)</u> |
|-------------|---------------|-------------------|-----------------------|---------------------|-----------------------------|--------------------------|
| 11-Apr      | LRS           | Indian Point      | 43                    | 1-m Epibenthic Sled | 1                           | 544                      |
| 30-Apr      | LRS           | Yonkers           | 14                    | 1-m Epibenthic Sled | 1                           | 468                      |
| 30-May      | LRS           | Poughkeepsie      | 73                    | 1-m Tucker Trawl    | 1                           | YSL                      |
| 30-May      | LRS           | Saugerties        | 99                    | 1-m Tucker Trawl    | 1                           | YSL                      |
| 31-May      | LRS           | Poughkeepsie      | 68                    | 1-m Epibenthic Sled | 1                           | YSL                      |
| 5-Jun       | LRS           | Poughkeepsie      | 74                    | 1-m Tucker Trawl    | 1                           | PYSL                     |
| 6-Jun       | LRS           | Battery           | 7                     | 1-m Epibenthic Sled | 1                           | 538                      |
| 6-Jun       | LRS           | West Point        | 54                    | 1-m Epibenthic Sled | 1                           | 319                      |
| 13-Jun      | LRS           | West Point        | 53                    | 1-m Epibenthic Sled | 1                           | PYSL                     |
| 13-Jun      | LRS           | Cornwall          | 59                    | 1-m Epibenthic Sled | 1                           | 295                      |
| 3-Jul       | FJS           | West Point        | 54                    | 3-m Beam Trawl      | 1                           | 407                      |
| 3-Jul       | FJS           | West Point        | 55                    | 3-m Beam Trawl      | 3                           | 360,478,481              |
| 10-Jul      | LRS           | West Point        | 48                    | 1-m Epibenthic Sled | 1                           | 405                      |
| 17-Jul      | FJS           | Yonkers           | 19                    | 3-m Beam Trawl      | 1                           | 755                      |
| 17-Jul      | FJS           | Indian Point      | 40                    | 3-m Beam Trawl      | 2                           | 491,753                  |
| 17-Jul      | FJS           | Indian Point      | 41                    | 3-m Beam Trawl      | 2                           | 484,546                  |
| 18-Jul      | FJS           | West Point        | 51                    | 3-m Beam Trawl      | 1                           | 510                      |
| 18-Jul      | FJS           | West Point        | 54                    | 3-m Beam Trawl      | 1                           | 401                      |
| 18-Jul      | FJS           | West Point        | 55                    | 3-m Beam Trawl      | 1                           | 365                      |
| 18-Jul      | FJS           | Cornwall          | 56                    | 3-m Beam Trawl      | 3                           | 131,504,520              |
| 18-Jul      | FJS           | Cornwall          | 57                    | 3-m Beam Trawl      | 1                           | 410                      |
| 26-Jul      | LRS           | Cornwall          | 57                    | 1-m Epibenthic Sled | 1                           | 146                      |
| 31-Jul      | FJS           | Poughkeepsie      | 71                    | 3-m Beam Trawl      | 1                           | 531                      |
| 31-Jul      | FJS           | Hyde Park         | 77                    | 3-m Beam Trawl      | 1                           | 392                      |
| 31-Jul      | FJS           | Hyde Park         | 82                    | 3-m Beam Trawl      | 1                           | 150                      |
| 1-Aug       | FJS           | West Point        | 54                    | 3-m Beam Trawl      | 2                           | 380,975                  |
| 1-Aug       | FJS           | West Point        | 55                    | 3-m Beam Trawl      | 1                           | 480                      |
| 1-Aug       | FJS           | Poughkeepsie      | 68                    | 3-m Beam Trawl      | 1                           | 468                      |
| 2-Aug       | FJS           | Indian Point      | 41                    | 3-m Beam Trawl      | 1                           | 384                      |
| 8-Aug       | LRS           | West Point        | 55                    | 1-m Epibenthic Sled | 1                           | 503                      |
| 14-Aug      | FJS           | Saugerties        | 97                    | 3-m Beam Trawl      | 2                           | 358,388                  |
| 15-Aug      | FJS           | West Point        | 55                    | 3-m Beam Trawl      | 5                           | 358,495,502,397,524      |
| 16-Aug      | FJS           | Croton-Haverstraw | 37                    | 3-m Beam Trawl      | 1                           | 977                      |
| 16-Aug      | FJS           | Indian Point      | 41                    | 3-m Beam Trawl      | 1                           | 502                      |
| 16-Aug      | FJS           | West Point        | 48                    | 3-m Beam Trawl      | 2                           | 525,546                  |
| 23-Aug      | LRS           | West Point        | 55                    | 1-m Epibenthic Sled | 1                           | 947                      |
| 30-Aug      | FJS           | West Point        | 51                    | 3-m Beam Trawl      | 1                           | 499                      |
| 30-Aug      | FJS           | West Point        | 54                    | 3-m Beam Trawl      | 1                           | 185                      |
| 30-Aug      | FJS           | West Point        | 55                    | 3-m Beam Trawl      | 1                           | 155                      |
| 30-Aug      | FJS           | Cornwall          | 58                    | 3-m Beam Trawl      | 2                           | 381,374                  |

Table 4-3 (Continued)

| <u>Date</u> | <u>Survey</u> | <u>Region</u>     | <u>River<br/>Mile</u> | <u>Gear</u>    | <u>Number<br/>Collected</u> | <u>Total Length (mm)</u>        |
|-------------|---------------|-------------------|-----------------------|----------------|-----------------------------|---------------------------------|
| 31-Aug      | FJS           | Indian Point      | 39                    | 3-m Beam Trawl | 1                           | 458                             |
| 12-Sep      | FJS           | West Point        | 54                    | 3-m Beam Trawl | 1                           | 402                             |
| 12-Sep      | FJS           | West Point        | 55                    | 3-m Beam Trawl | 4                           | 450,396,490,520                 |
| 13-Sep      | FJS           | Indian Point      | 41                    | 3-m Beam Trawl | 2                           | 425,914                         |
| 26-Sep      | FJS           | Battery           | 7                     | 3-m Beam Trawl | 1                           | 648                             |
| 8-Oct       | FJS           | Hyde Park         | 80                    | 3-m Beam Trawl | 1                           | 399                             |
| 21-Oct      | FJS           | Yonkers           | 15                    | 3-m Beam Trawl | 1                           | 576                             |
| 22-Oct      | FJS           | West Point        | 54                    | 3-m Beam Trawl | 1                           | 392                             |
| 24-Oct      | FJS           | Poughkeepsie      | 76                    | 3-m Beam Trawl | 1                           | 193                             |
| 5-Nov       | FJS           | Tappan Zee        | 26                    | 3-m Beam Trawl | 1                           | 495                             |
| 5-Nov       | FJS           | Croton-Haverstraw | 37                    | 3-m Beam Trawl | 1                           | 369                             |
| 5-Nov       | FJS           | Indian Point      | 39                    | 3-m Beam Trawl | 1                           | 410                             |
| 5-Nov       | FJS           | Indian Point      | 40                    | 3-m Beam Trawl | 2                           | 605,517                         |
| 5-Nov       | FJS           | West Point        | 48                    | 3-m Beam Trawl | 1                           | 408                             |
| 6-Nov       | FJS           | West Point        | 55                    | 3-m Beam Trawl | 4                           | 220,252,275,517                 |
| 19-Nov      | FJS           | Cornwall          | 56                    | 3-m Beam Trawl | 7                           | 225,265,268,414,441,<br>475,510 |



Table 4-4 Collections of Shortnose Sturgeon During the 2013 Hudson River Surveys

| <u>Date</u> | <u>Survey</u> | <u>Region</u>     | <u>River Mile</u> | <u>Gear</u>         | <u>Number Collected</u> | <u>Total Length (mm)</u> |
|-------------|---------------|-------------------|-------------------|---------------------|-------------------------|--------------------------|
| 18-Apr      | LRS           | Albany            | 131               | 1-m Epibenthic Sled | 1                       | 805                      |
| 1-Jul       | FJS           | Croton-Haverstraw | 34                | 3-m Beam Trawl      | 1                       | 775                      |
| 2-Jul       | FJS           | Kingston          | 92                | 3-m Beam Trawl      | 1                       | 813                      |
| 2-Jul       | FJS           | Saugerties        | 94                | 3-m Beam Trawl      | 1                       | 752                      |
| 2-Jul       | FJS           | Saugerties        | 105               | 3-m Beam Trawl      | 1                       | 747                      |
| 3-Jul       | FJS           | Indian Point      | 42                | 3-m Beam Trawl      | 1                       | 775                      |
| 3-Jul       | FJS           | West Point        | 55                | 3-m Beam Trawl      | 2                       | 705,710                  |
| 18-Jul      | FJS           | West Point        | 55                | 3-m Beam Trawl      | 1                       | 810                      |
| 18-Jul      | FJS           | Cornwall          | 57                | 3-m Beam Trawl      | 1                       | 880                      |
| 19-Jul      | FJS           | Poughkeepsie      | 72                | 3-m Beam Trawl      | 1                       | 1164                     |
| 19-Jul      | FJS           | Hyde Park         | 77                | 3-m Beam Trawl      | 1                       | 785                      |
| 19-Jul      | FJS           | Hyde Park         | 84                | 3-m Beam Trawl      | 1                       | 769                      |
| 20-Jul      | FJS           | Poughkeepsie      | 65                | 3-m Beam Trawl      | 1                       | 867                      |
| 30-Jul      | FJS           | Albany            | 139               | 3-m Beam Trawl      | 1                       | 933                      |
| 31-Jul      | FJS           | Poughkeepsie      | 73                | 3-m Beam Trawl      | 1                       | 746                      |
| 31-Jul      | FJS           | Hyde Park         | 77                | 3-m Beam Trawl      | 1                       | 711                      |
| 31-Jul      | FJS           | Hyde Park         | 81                | 3-m Beam Trawl      | 1                       | 674                      |
| 31-Jul      | FJS           | Kingston          | 91                | 3-m Beam Trawl      | 1                       | 1065                     |
| 1-Aug       | FJS           | Cornwall          | 58                | 3-m Beam Trawl      | 1                       | 701                      |
| 2-Aug       | FJS           | Croton-Haverstraw | 38                | 3-m Beam Trawl      | 1                       | 713                      |
| 2-Aug       | FJS           | Indian Point      | 39                | 3-m Beam Trawl      | 1                       | 712                      |
| 2-Aug       | FJS           | Indian Point      | 40                | 3-m Beam Trawl      | 3                       | 619,708,711              |
| 13-Aug      | FJS           | Albany            | 127               | 3-m Beam Trawl      | 1                       | 875                      |
| 14-Aug      | FJS           | Hyde Park         | 84                | 3-m Beam Trawl      | 1                       | 713                      |
| 28-Aug      | FJS           | Saugerties        | 94                | 3-m Beam Trawl      | 2                       | 700,740                  |
| 28-Aug      | FJS           | Saugerties        | 96                | 3-m Beam Trawl      | 1                       | 774                      |
| 30-Aug      | FJS           | West Point        | 55                | 3-m Beam Trawl      | 3                       | 710,739,818              |
| 30-Aug      | FJS           | Poughkeepsie      | 68                | 3-m Beam Trawl      | 1                       | 750                      |
| 31-Aug      | FJS           | Indian Point      | 40                | 3-m Beam Trawl      | 1                       | 785                      |
| 13-Sep      | FJS           | Tappan Zee        | 31                | 3-m Beam Trawl      | 1                       | 841                      |
| 13-Sep      | FJS           | Croton-Haverstraw | 35                | 3-m Beam Trawl      | 1                       | 901                      |
| 25-Sep      | FJS           | Hyde Park         | 82                | 3-m Beam Trawl      | 1                       | 841                      |
| 25-Sep      | FJS           | Saugerties        | 94                | 3-m Beam Trawl      | 1                       | 633                      |
| 27-Sep      | FJS           | Croton-Haverstraw | 36                | 3-m Beam Trawl      | 1                       | 880                      |
| 8-Oct       | FJS           | Kingston          | 87                | 3-m Beam Trawl      | 1                       | 682                      |
| 23-Oct      | FJS           | Saugerties        | 96                | 3-m Beam Trawl      | 1                       | 683                      |
| 6-Nov       | FJS           | West Point        | 55                | 3-m Beam Trawl      | 1                       | 722                      |
| 7-Nov       | FJS           | Kingston          | 93                | 3-m Beam Trawl      | 1                       | 895                      |

Table 4-5 Collections of Unidentified Sturgeon During the 2013 Hudson River Surveys

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| <u>Date</u> | <u>Survey</u> | <u>Region</u> | <u>River<br/>Mile</u> | <u>Gear</u>         | <u>Number<br/>Collected</u> | <u>Total Length (mm)</u> |
|-------------|---------------|---------------|-----------------------|---------------------|-----------------------------|--------------------------|
| 18-Jul      | FJS           | West Point    | 55                    | 3-m Beam Trawl      | 1                           | 72,68                    |
| 1-Aug       | FJS           | West Point    | 55                    | 3-m Beam Trawl      | 2                           | 92,118                   |
| 1-Aug       | FJS           | Poughkeepsie  | 68                    | 3-m Beam Trawl      | 1                           | 135                      |
| 8-Aug       | LRS           | Cornwall      | 57                    | 1-m Epibenthic Sled | 1                           | 130                      |
| 15-Aug      | FJS           | West Point    | 55                    | 3-m Beam Trawl      | 2                           | 152,159                  |