



**Kansas Department of  
Health and Environment  
Bureau of Environmental  
Field Services**

**Reference Lake  
Conditions**

# Methods Used

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U Whole Population

U Untrimmed Trisection Method

U Best Professional Judgement  
Selections

# Methods Used

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## Whole Population

- U Calculate 25th Percentile
- U Use 25th Percentile To Describe Threshold

# Methods Used

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## Untrimmed Trisection

- U Identify Best Third Of Population
- U Calculate 50th Or 75th Percentile Using Trisection Sub-Population

# Methods Used

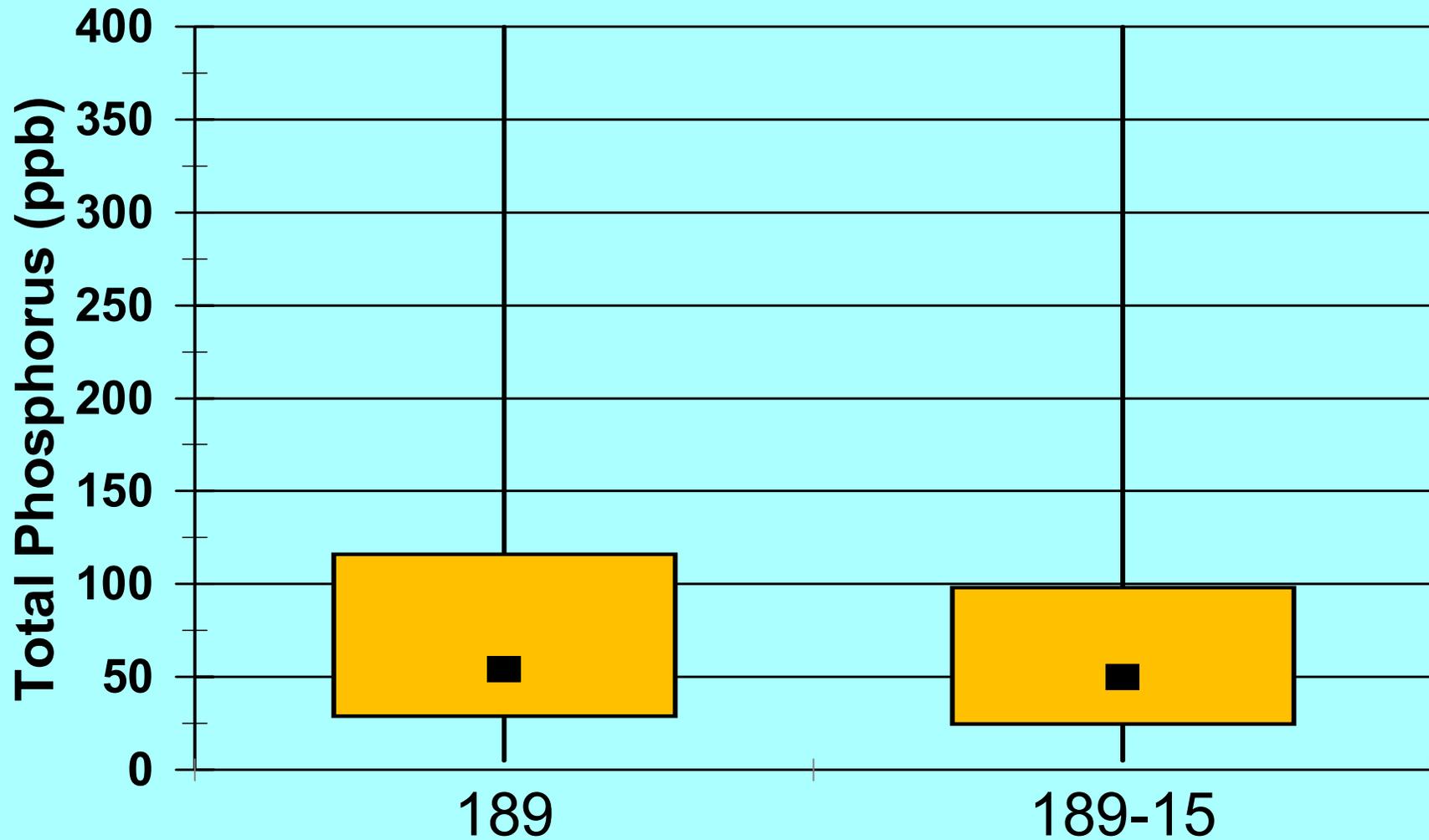
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## BPJ Selected Sites

- U Reference Lakes Selected Based On Watershed And In-Lake Characteristics
  - <20-30% Agricultural Or Urban Land Uses
  - Lack Of Documented Water Quality Problems
- U 75th Percentile Calculated

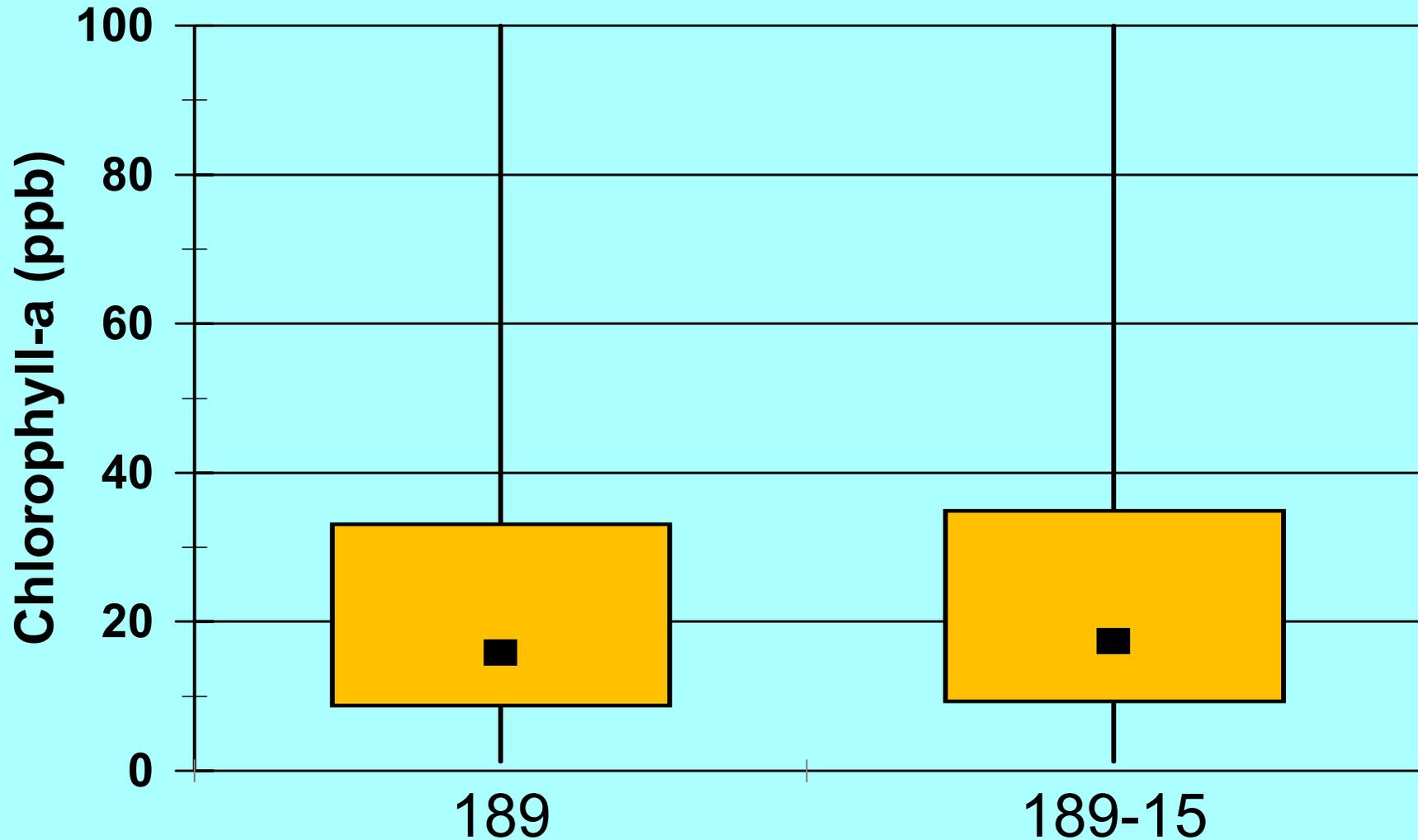
# Entire Population

With/Without Argillotrophic Sites



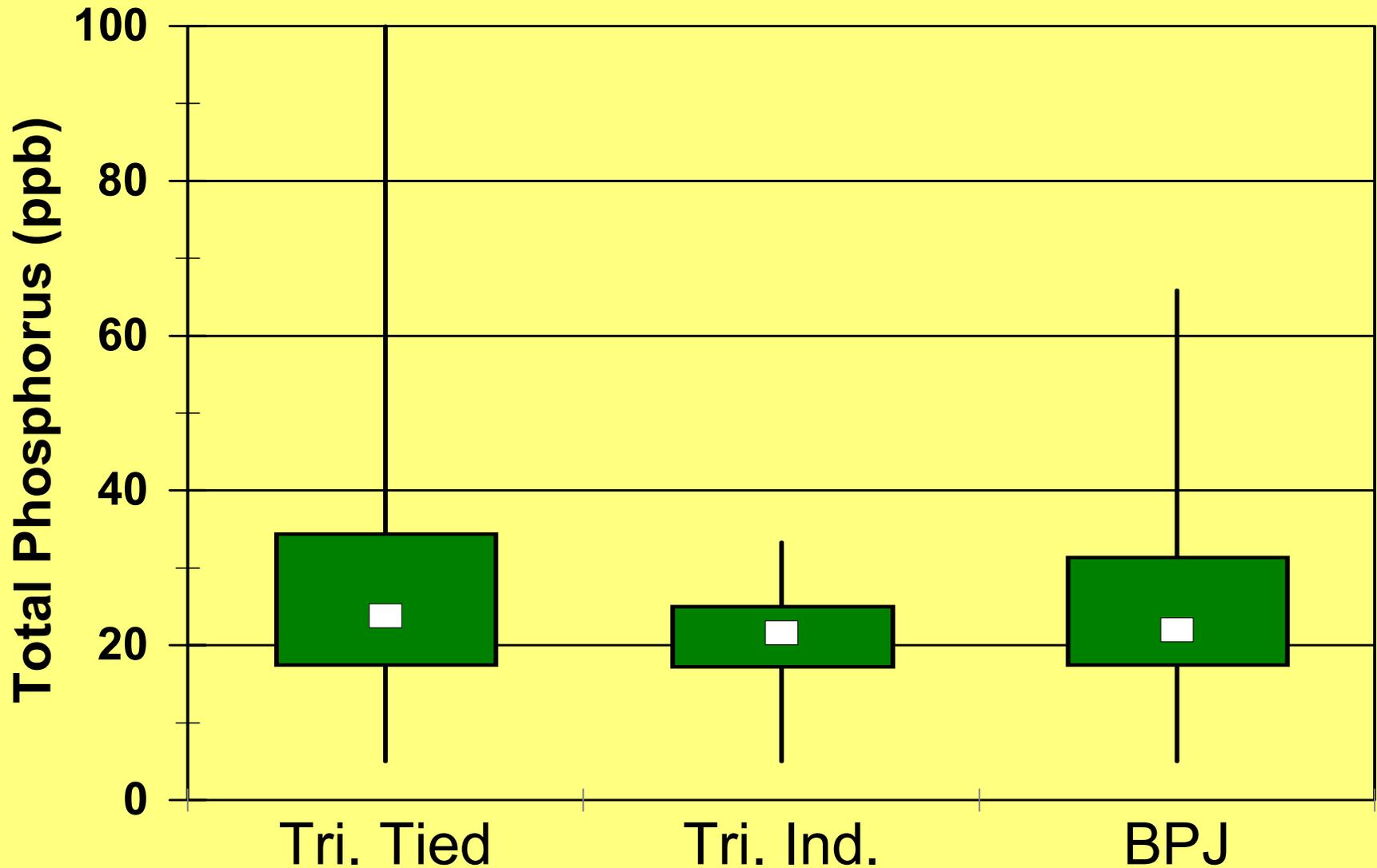
# Entire Population

With/Without Argillotrophic Sites



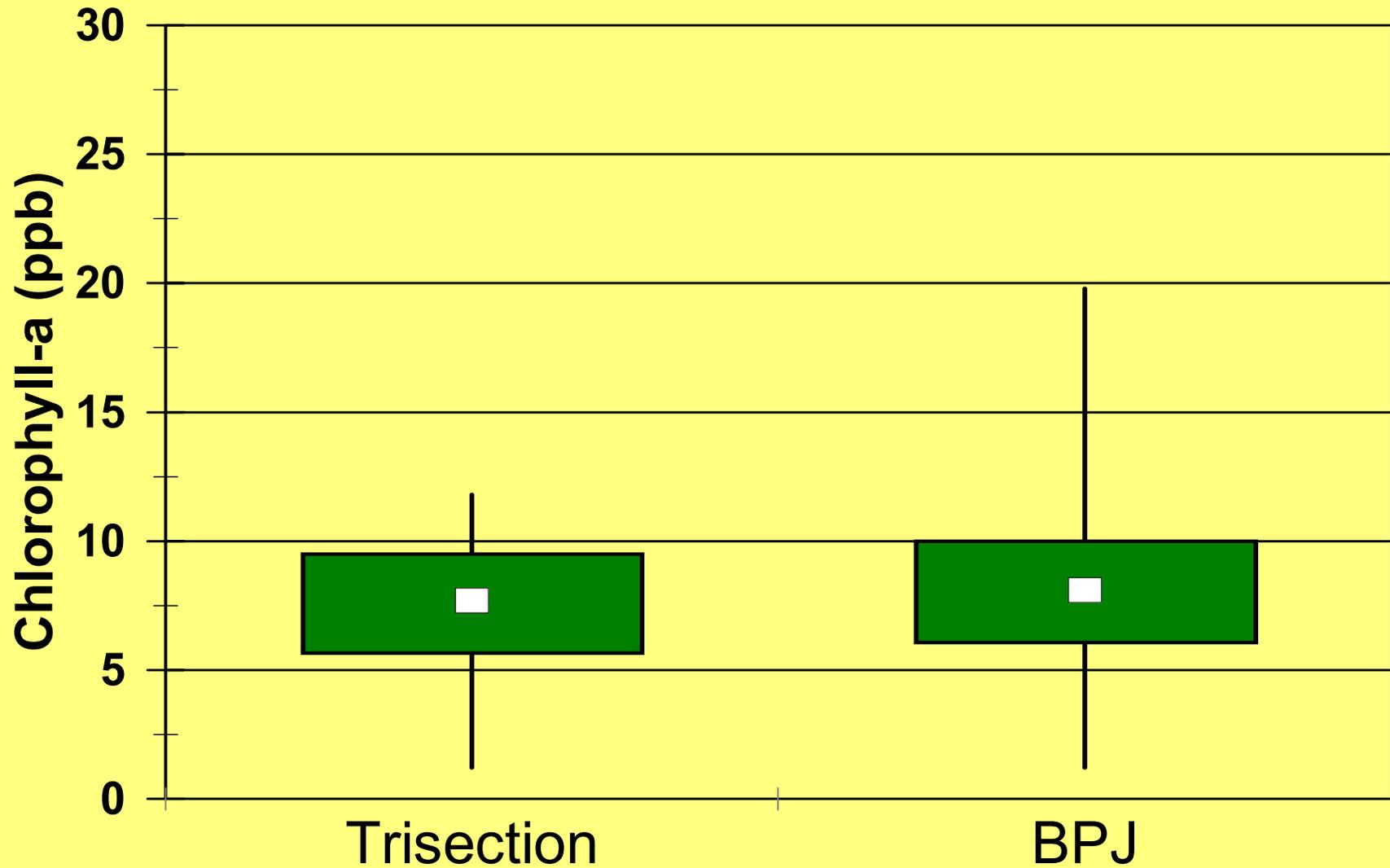
# Reference Condition: Phosphorus

## Trisection and Selected Ref. Sites

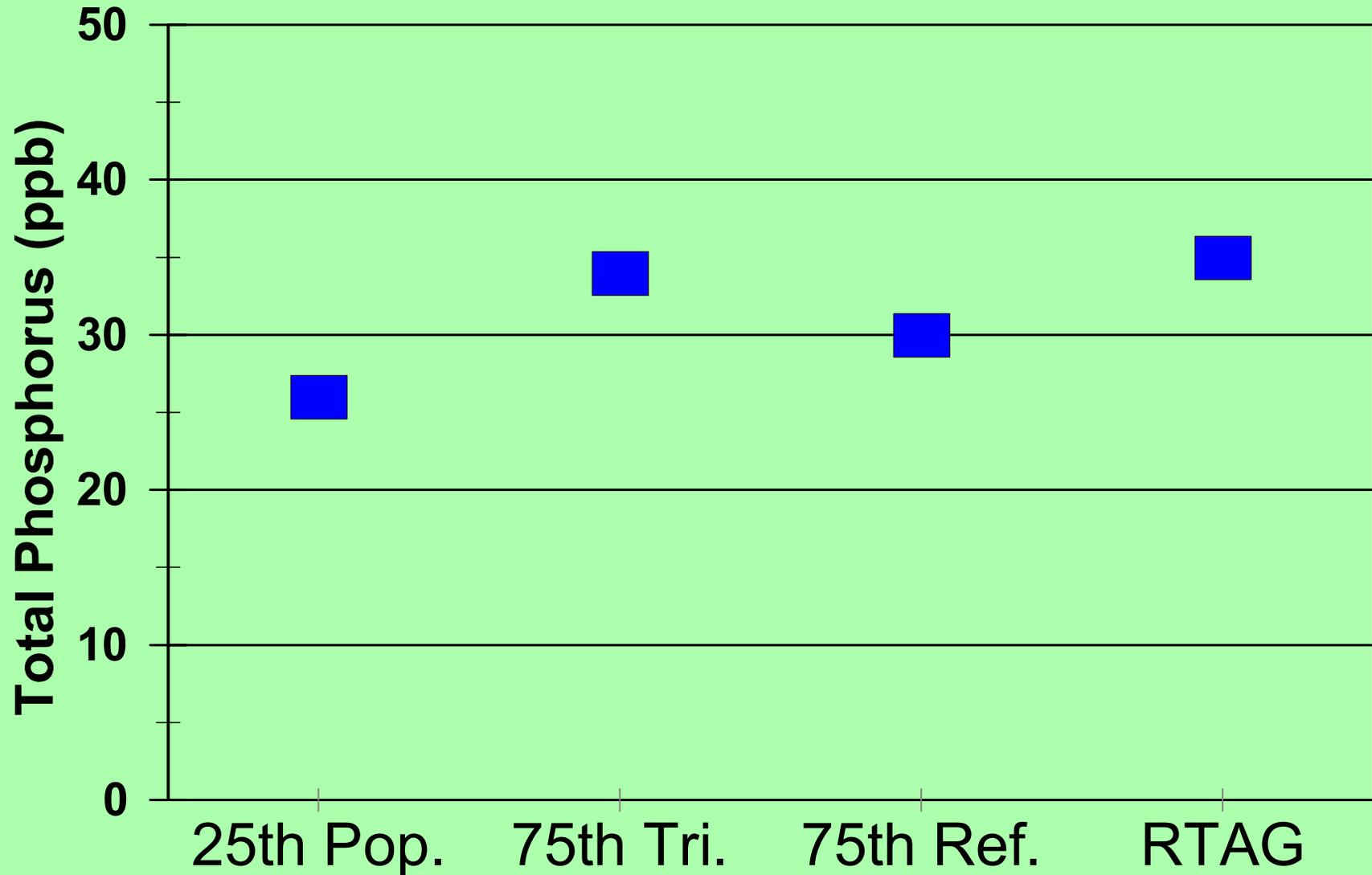


# Reference Condition: Chlorophyll

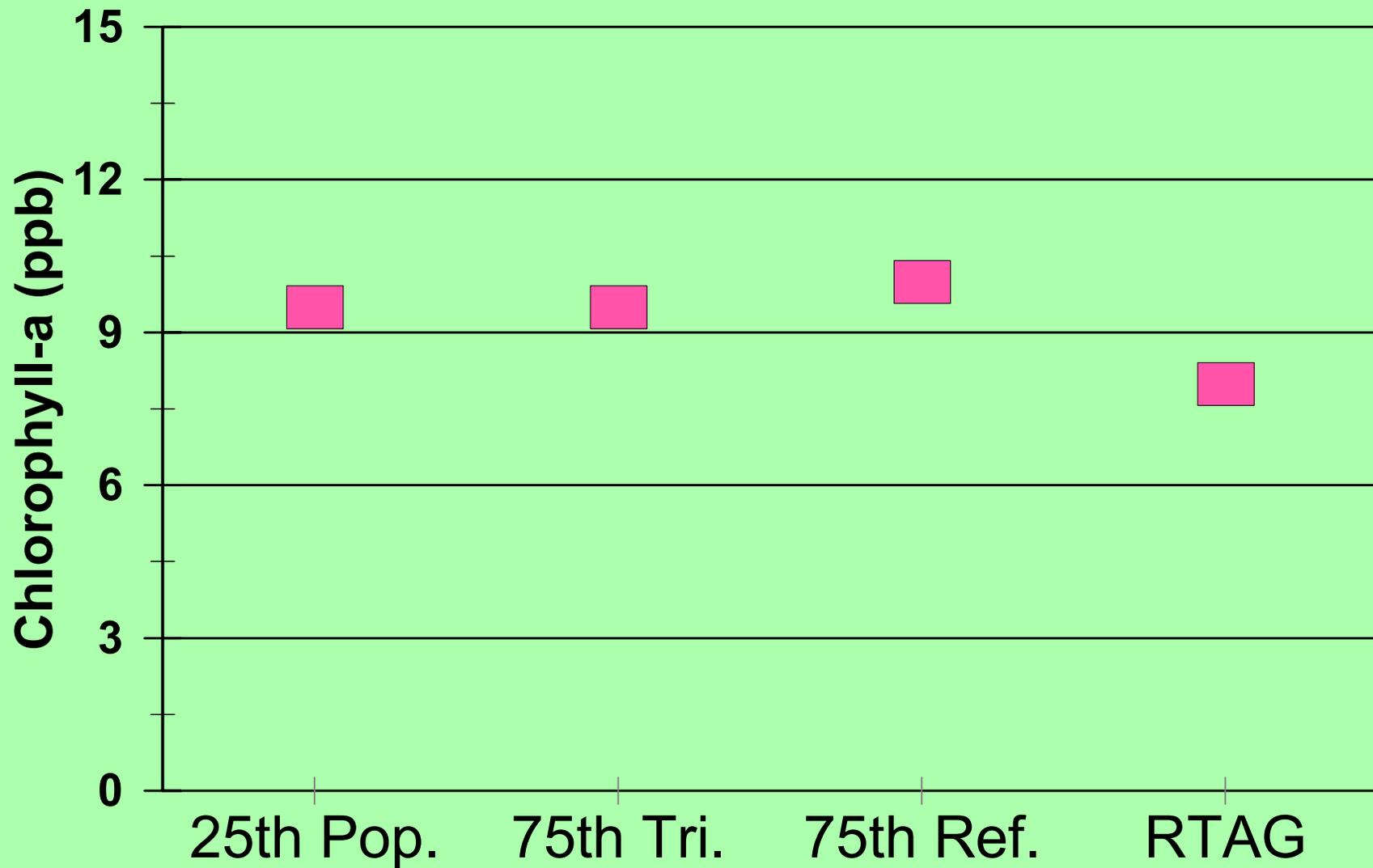
Trisection and Selected Ref. Sites



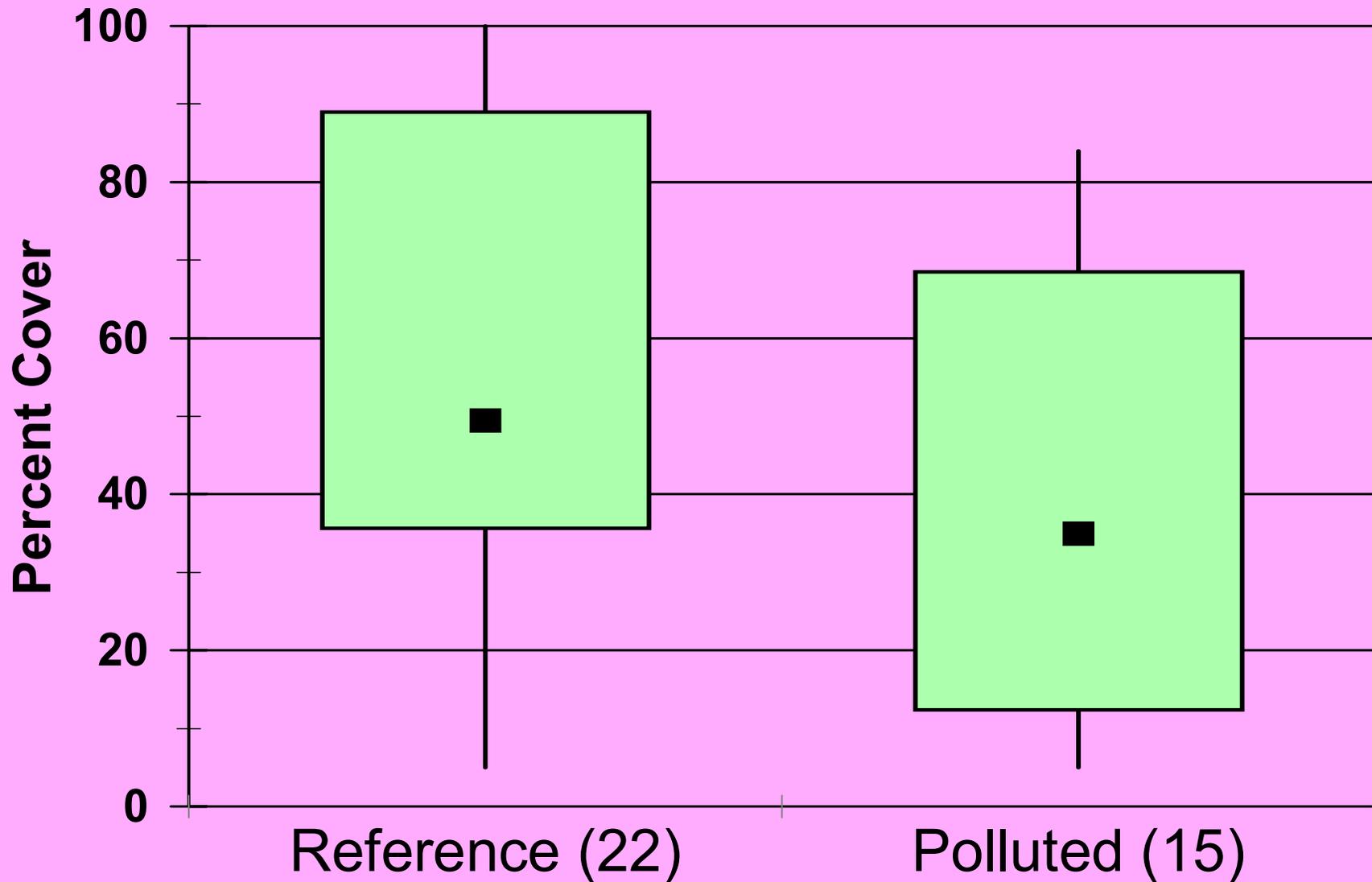
# Comparison of Threshold Values Total Phosphorus



# Comparison of Threshold Values Chlorophyll-a

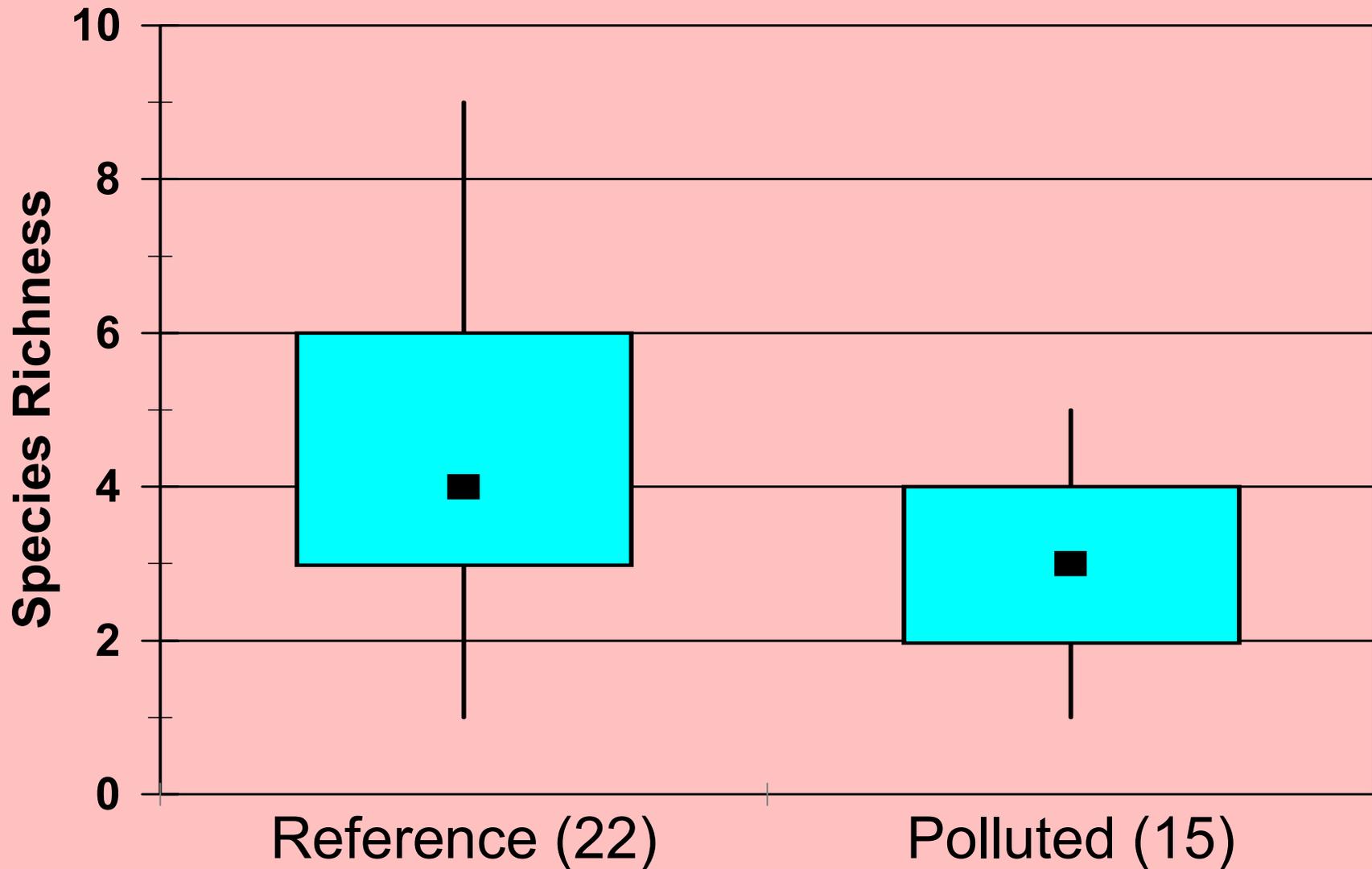


# Macrophyte Communities Vs. Trisection Groups

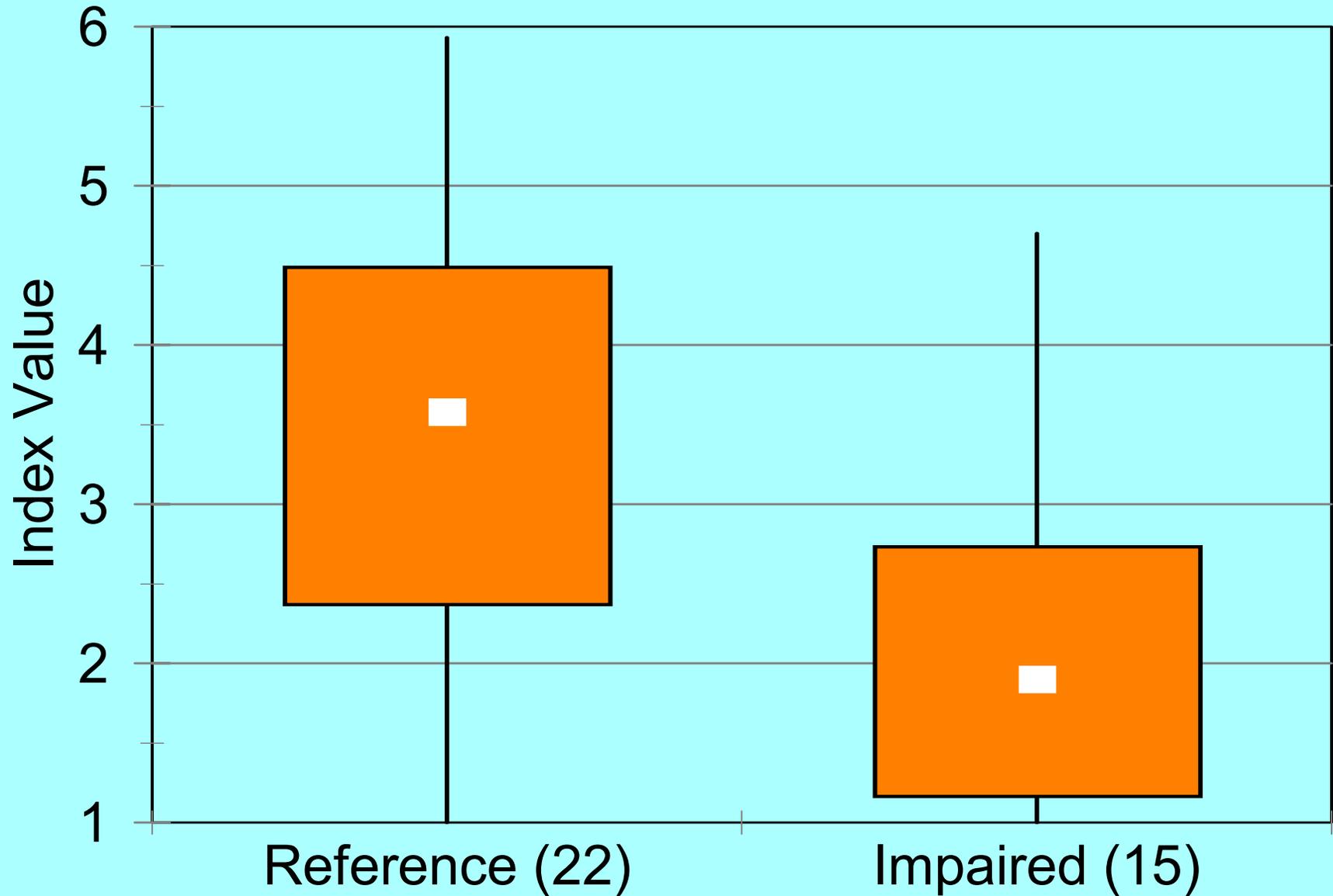


# Macrophyte Communities

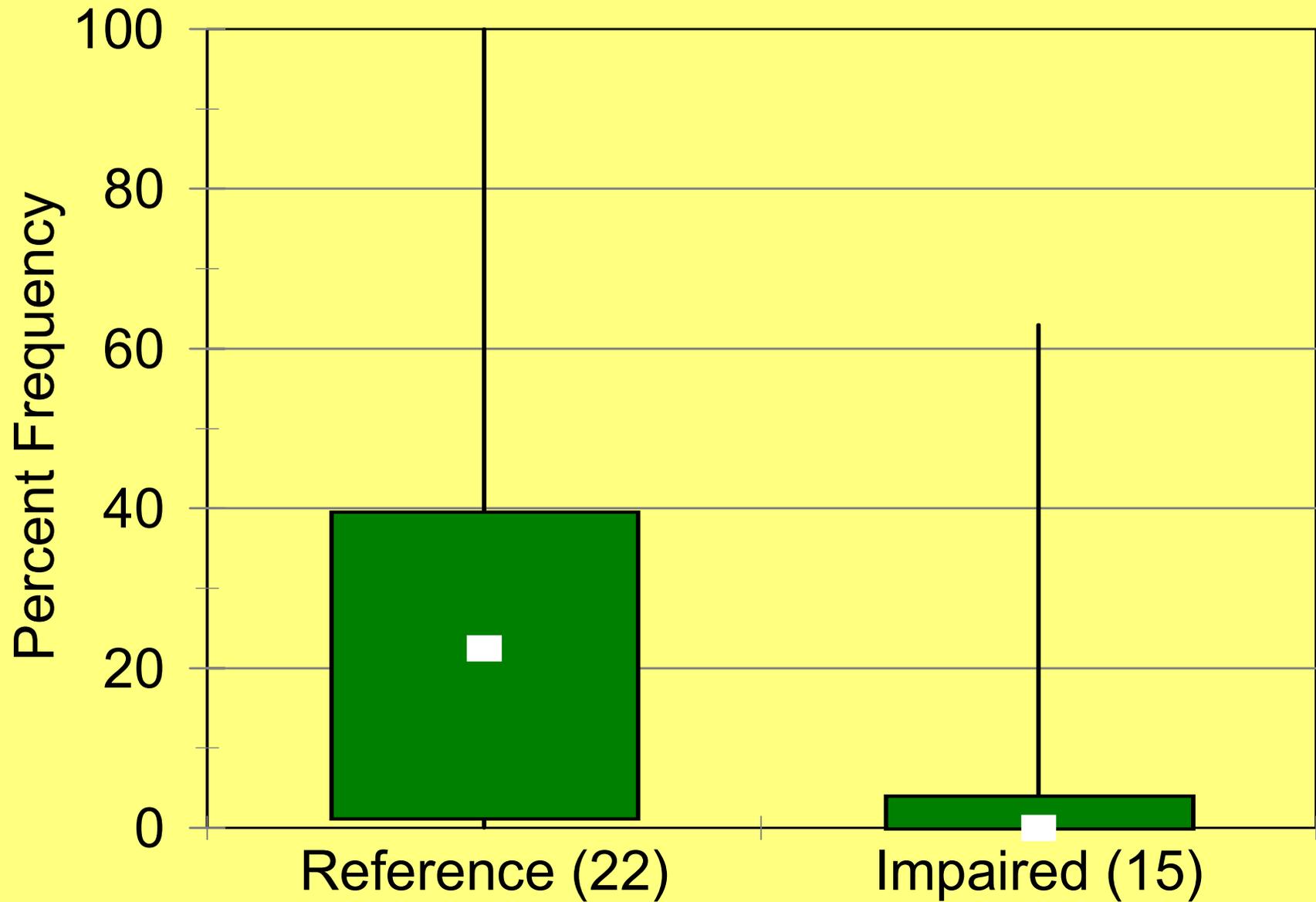
Vs. Trisection Groups



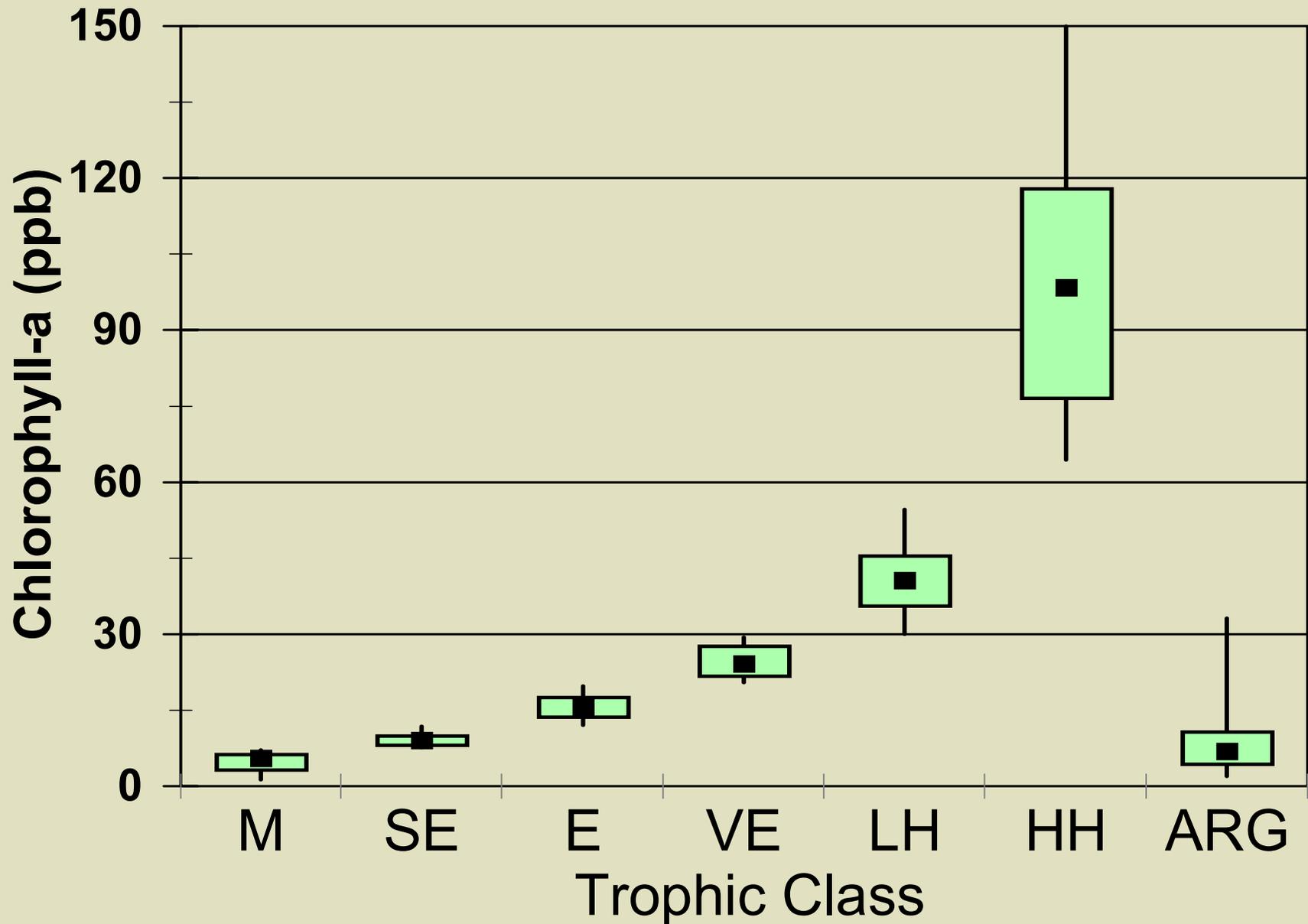
# Simpson's Diversity Index



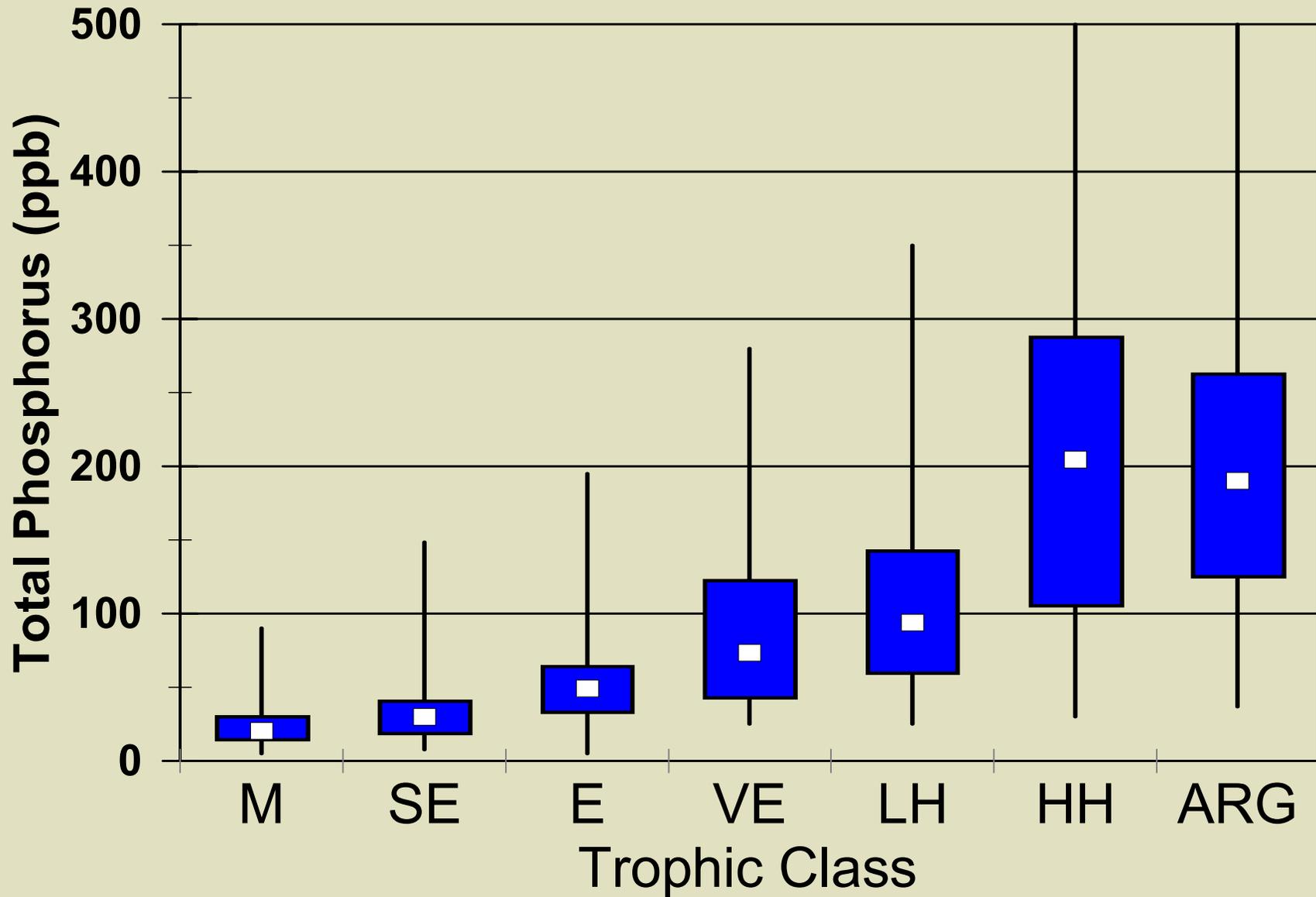
# Percent Charophytes



# Chlorophyll Vs. Trophic Class



# Total Phosphorus Vs. Trophic Class



# Use Support Thresholds

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## Based On Observational Scores

- U Based On Heiskary And Walker, 1988
- U Water Quality Scored Based On “Green-ness” Observed Against The Secchi Disk White Quarters At Half The Secchi Depth Or 1.0 Meter, Whichever Is Shallower
- U Score Of 1-10 Assigned Based On Level Of Green Observed And Level Of Comfort With That Water For Various Uses

# Use Support Thresholds

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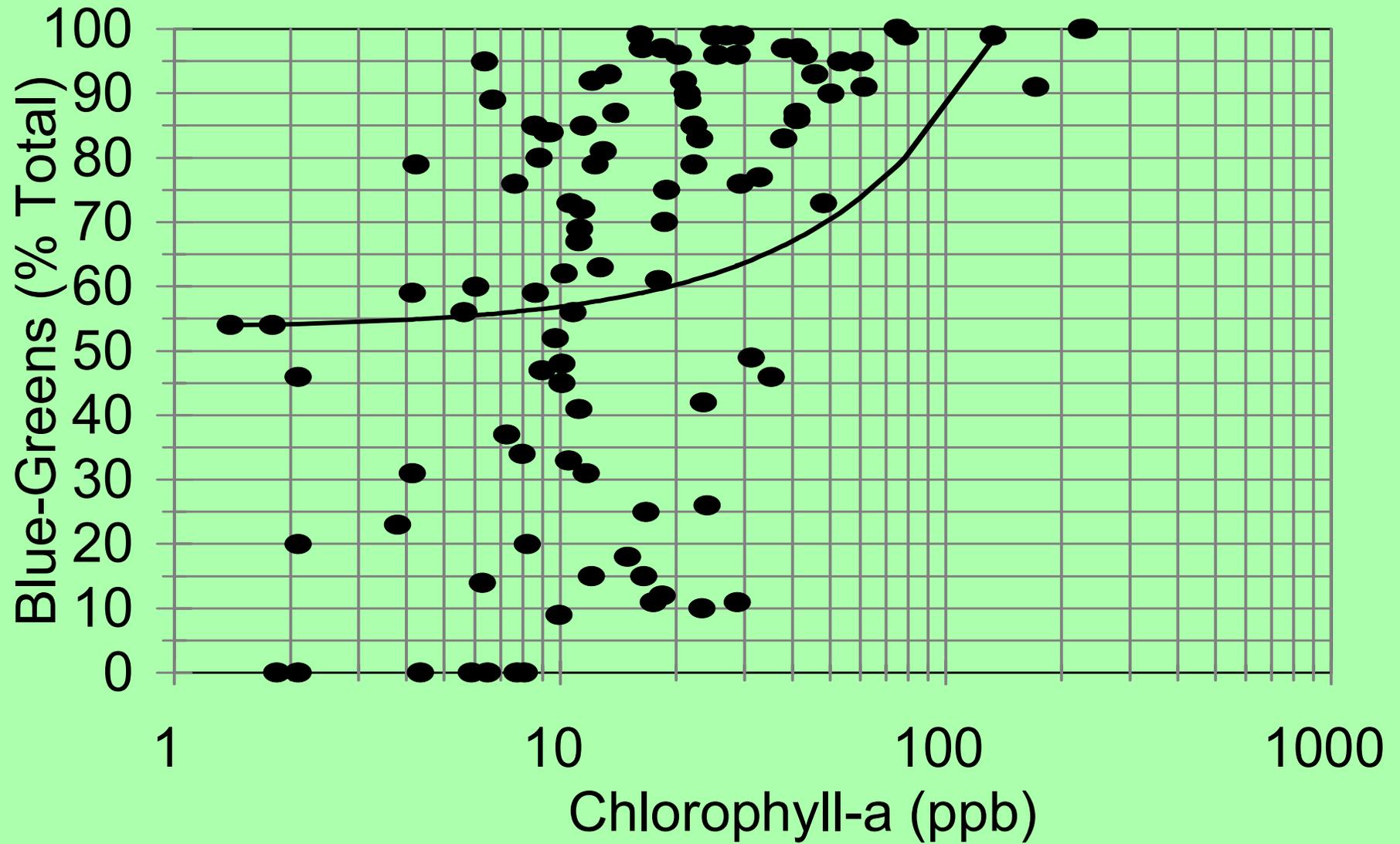
## Based On Observational Scores

- U Scores Divided Into 10 Equal Groups For Each Use/Parameter And Tied To Water Quality Data
- U Area Probability Curves Generated
- U Thresholds For Use Support Calculated From Those Area Curves
- U Provides “Risk Based” Thresholds

# Threshold Comparison To Uses

	TP (ppb)		Chl-a (ppb)	
<b>25th %ile Pop.</b>	<b>26</b>		<b>9.5</b>	
<b>50th %ile Trisection</b>	<b>24</b>		<b>7.7</b>	
<b>75th %ile Trisection</b>	<b>34</b>		<b>9.5</b>	
<b>75th %ile Ref. Pop.</b>	<b>30</b>		<b>10</b>	
<b>EPA RTAG</b>	<b>35</b>		<b>8</b>	
<b>10% Risk: Aesthetics Uses</b>	<b>15</b>	<b>30</b>	<b>6</b>	<b>12</b>
<b>10% Risk: Pri. Contact</b>	<b>21</b>	<b>45</b>	<b>10</b>	<b>23</b>
<b>10% Risk: Sec. Contact</b>	<b>44</b>	<b>101</b>	<b>20</b>	<b>39</b>

# Less High Turbidity, Macrophytes



# Current Lakes Meeting Thresholds

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	Meeting TP No.	Meeting Chl-a No.
25th %ile Population	25%	24%
75th %ile Trisection	34%	24%
75th %ile Reference Population	27%	32%
EPA RTAG	37%	18%

# Comparison To National Numbers

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## Total Phosphorus (ppb)

	National 25th Percentile	KDHE, 1998
25 Western High Plains	24	21
26 Southwestern Table Lands	20	21
27 Central Great Plains	32	35
28 Flint Hills	31	16
29 Central Oklahoma/Texas Plains	19	n.a.
39 Ozark Highlands	24	n.a.
40 Central Irregular Plains	40	19
47 Western Corn Belt Plains	55	26

# Comparison To National Numbers

## Chlorophyll-a (ppb)

	National 25th Percentile	KDHE, 1998
25 Western High Plains	2.4	7.6
26 Southwestern Table Lands	1.2	7.6
27 Central Great Plains	5.8	7.6
28 Flint Hills	5.5	4.7
29 Central Oklshoma/Texas Plains	2.9	n.a.
39 Ozark Highlands	6.1	n.a.
40 Central Irregular Plains	5.6	6.5
47 Western Corn Belt Plains	14.6	13.2

# Your Lake On Reference Conditions.....

**Any Questions?**

