Determining How Much Algae is Too Much Algae in WV Streams

NWQMC – May 1, 2014

Cincinnati, OH

Kevin R Coyne, Mike Arcuri

Water Quality Standards Program

WV Dept. of Environmental Protection

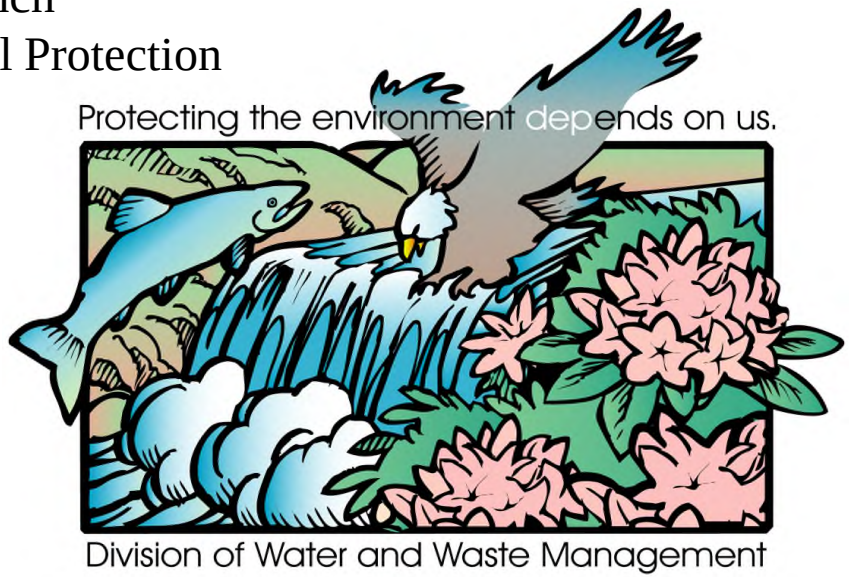
James Summers

Watershed Assessment Branch

WV Dept. of Environmental Protection

Mark Duda

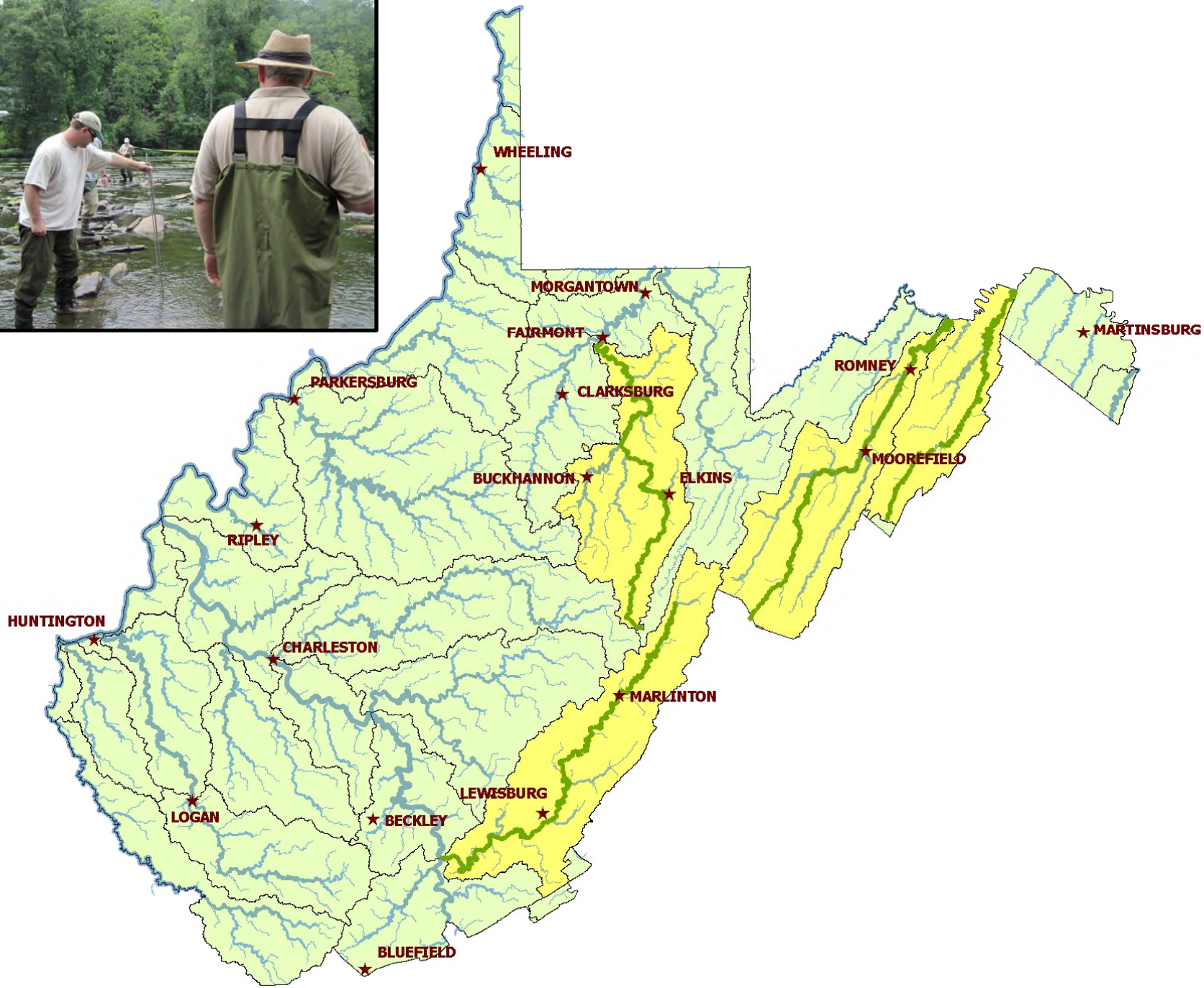
Responsive Management



Greenbrier River
Below White Sulphur Springs

Greenbrier River
Below Ronceverte

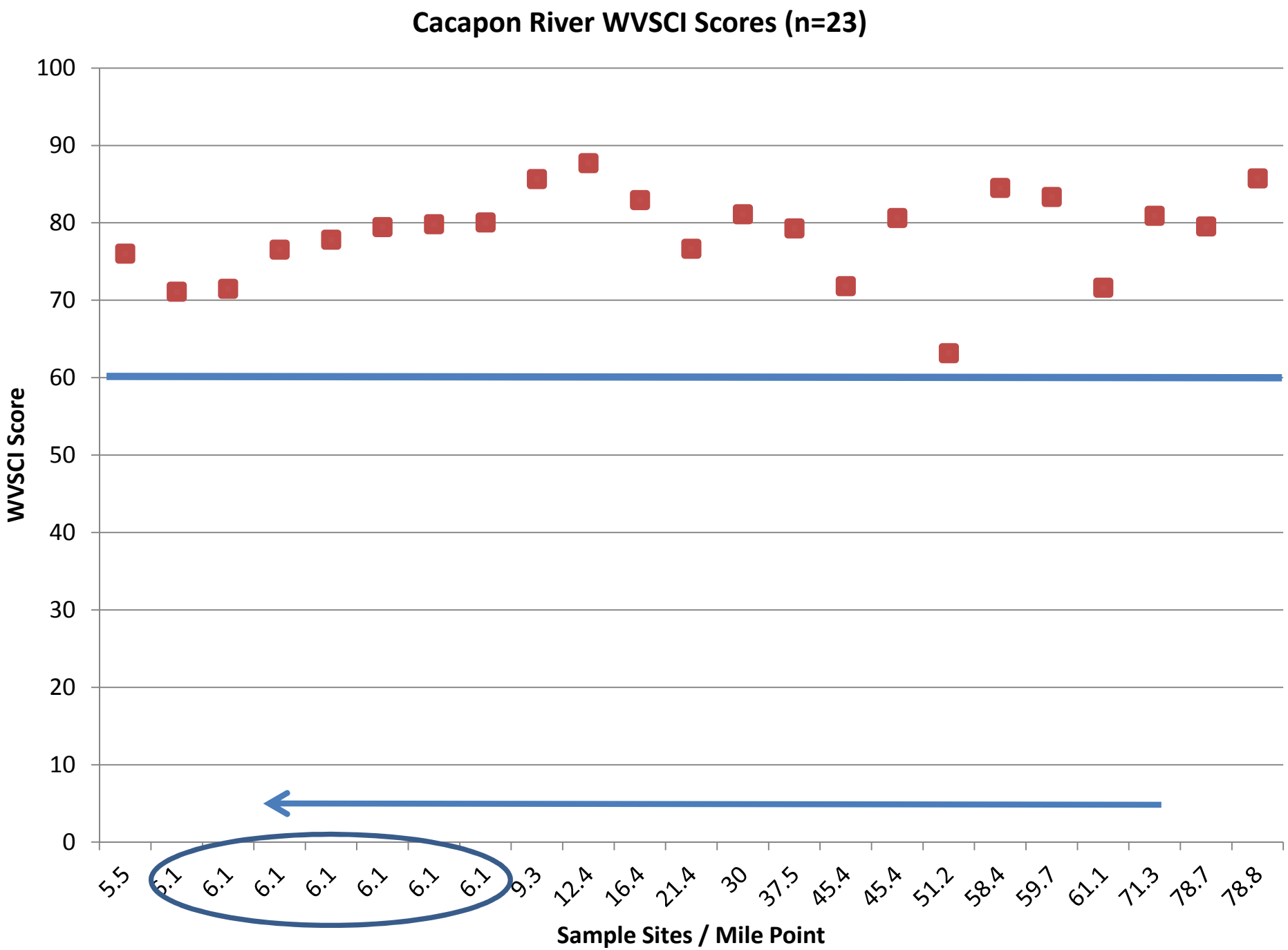
- Algae 101
  - Filamentous (vs. *Toxic Blooms*)
  - Increased nutrient concentrations (TP)
  - Other factors involved:
    - Physical conditions (low water, temp)
    - Water chemistry
      - Hardness
      - Alkalinity


WHEELING
MORGANTOWN
FAIRMONT
PARKERSBURG
CLARKSBURG
ROMNEY
MARTINSBURG
MOOREFIELD
BUCKHANNON
ELKINS
RIPLEY
HUNTINGTON
CHARLESTON
MARLINTON
LEWISBURG
LOGAN
BECKLEY
BLUEFIELD

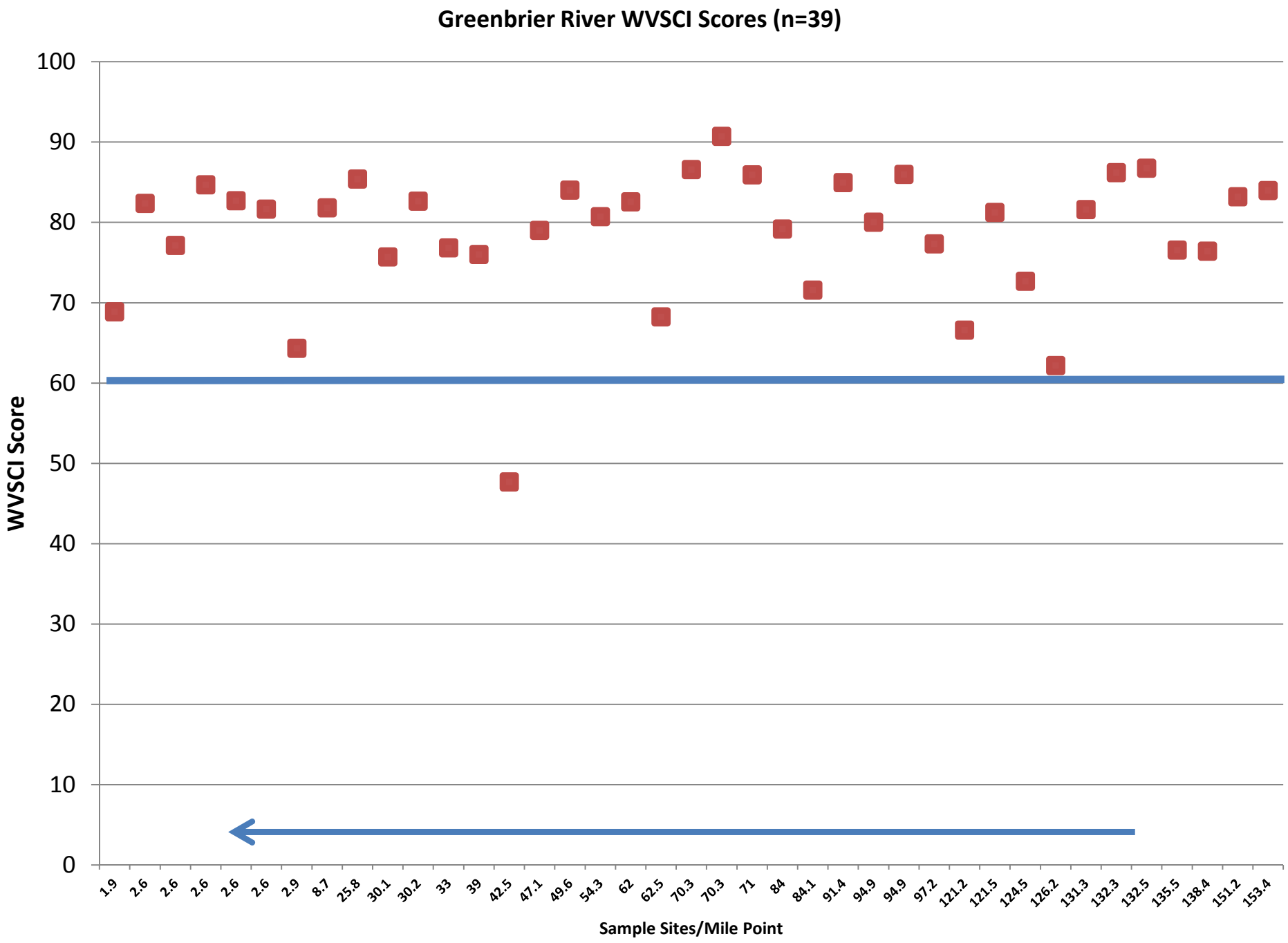
Cacapon River

Greenbrier River
~ 1 mile below Caldwell – How 1

Cacapon River


Cacapon River WVSCI Scores (n=23)
WVSCI Score
100
90
80
70
60
50
40
30
20
10
0
5.5
6.1
6.1
6.1
6.1
6.1
6.1
6.1
9.3
12.4
16.4
21.4
30
37.5
45.4
45.4
51.2
58.4
59.7
61.1
71.3
78.7
78.8
Sample Sites / Mile Point

Greenbrier River
Below White Sulphur Springs


Greenbrier River WVSCI Scores (n=39)
WVSCI Score
100
90
80
70
60
50
40
30
20
10
0
1.9
2.6
2.6
2.6
2.6
2.6
2.9
8.7
25.8
30.1
30.2
33
39
42.5
47.1
49.6
54.3
62
62.5
70.3
70.3
71
84
84.1
91.4
94.9
94.9
97.2
121.2
121.5
124.5
126.2
131.3
132.3
132.5
135.5
138.4
151.2
153.4
Sample Sites/Mile Point

History (NNC – WV)

- State approach NNC – Watershed Specific vs. Statewide
  - Lakes: Completed (TP/Ch. a)
  - Streams/Rivers:
    - N-STEPS (2008) = ? Relationships
    - Localized issues (Greenbrier)
- Proposed criteria (Greenbrier) & Permit limits
  - 2011 Triennial Review
    - 10 µg/L (30 day/average, May-October)
    - Removed by Legislature (☹)
  - Permit limits
    - 2009 (appealed/EQB)
    - DEP appeal to Circuit Court - Decision 2011(☹)

Marching Orders…

- Appeal (10-AA-132) outlined questions that we (DEP) needed to answer including:

as "significant," contained within the state water quality criteria; the WVDEP failed to determine what level of algae growth would be considered detrimental to the designated uses of the River;

(*"How much is too much?"*)

"How much is too much?"
Survey/Contractor Procurement

- Out for bid (RFP) - Fall of 2011
  - Responsive Management (RM) - *Harrisonburg, VA*
- What we wanted?
  - Statewide survey (*complete now vs later)*
  - ***<u>Scientifically defensible/limit biases</u>***
  - Contractor with experience in development/implementation of surveys

"How much is too much?" Survey Development

- DEP/RM developed general approach
- RM submitted specific survey tool/DEP approved:
  - Survey WV residents
  - Utilize phone/internet
  - DEP/RM cooperative effort to increase # of respondents/save on costs

"How much is too much?" Survey Implementation

- Basics steps:
  1. RM ID'd residents
  2. Call to confirm participation in survey (Y/N)
  3. Y = distribute survey via internet or mailings
  4. RM conduct survey/collect data, etc…

"How much is too much?"
Survey - what was collected?

- 1st piece, population info:
  - Recreation, what types (fish, swim), how often, in what types (river, lake, pond)?
  - When and where…?

  <u>(Lesson #1 - Great info for future use/beyond this project)</u>

  Types of Questions:

“How much is too much?”
Survey -?’s

- Q22. *“…if you personally participated in any of the following activities on or in…”*
- Q30. *“…types of water bodies did you participate in these activities...”*
- Q100. *“…anyone if your household currently work as an outfitter or guide…”*

"How much is too much?"
Survey - what was collected?

- 2nd piece, algae level info:

  <u>Knowledge of algae levels/impacts in WV</u>

- Q53. *"How much would you say you know about algae in WV waters?"*
- Q54. *"…algae in WV waters has increased, stayed about the same, or decreased..."*

"How much is too much?"
Survey - what was collected?

- 2nd piece, algae level info:

  <u>Algae tolerance levels</u>

  - Utilized photos
    - Respondents determined point when level becomes unacceptable

    (% cover low → high)

Photo: JS1

Photo: 2229

Photo: 009

Photo: 2213

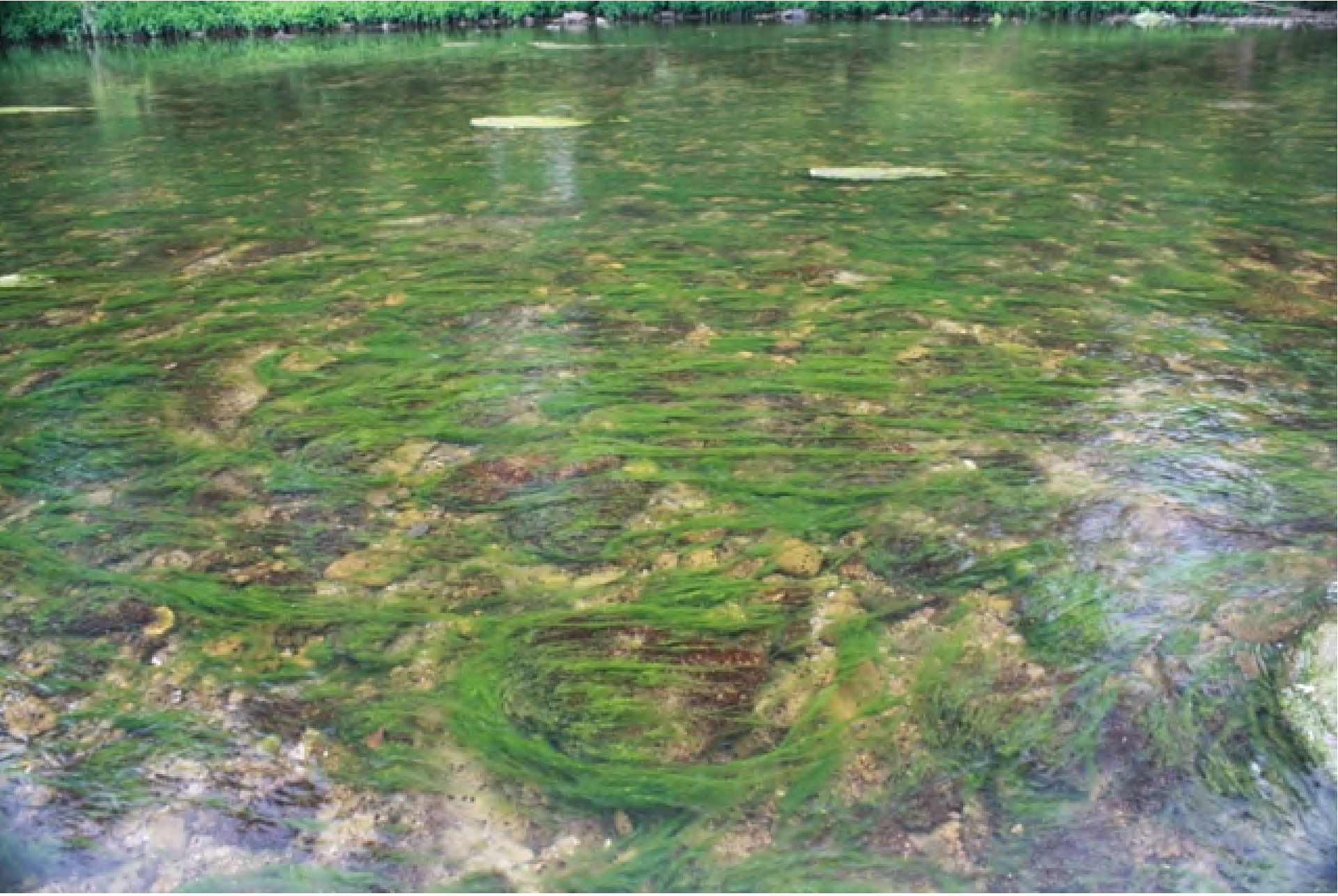


Photo: 2241

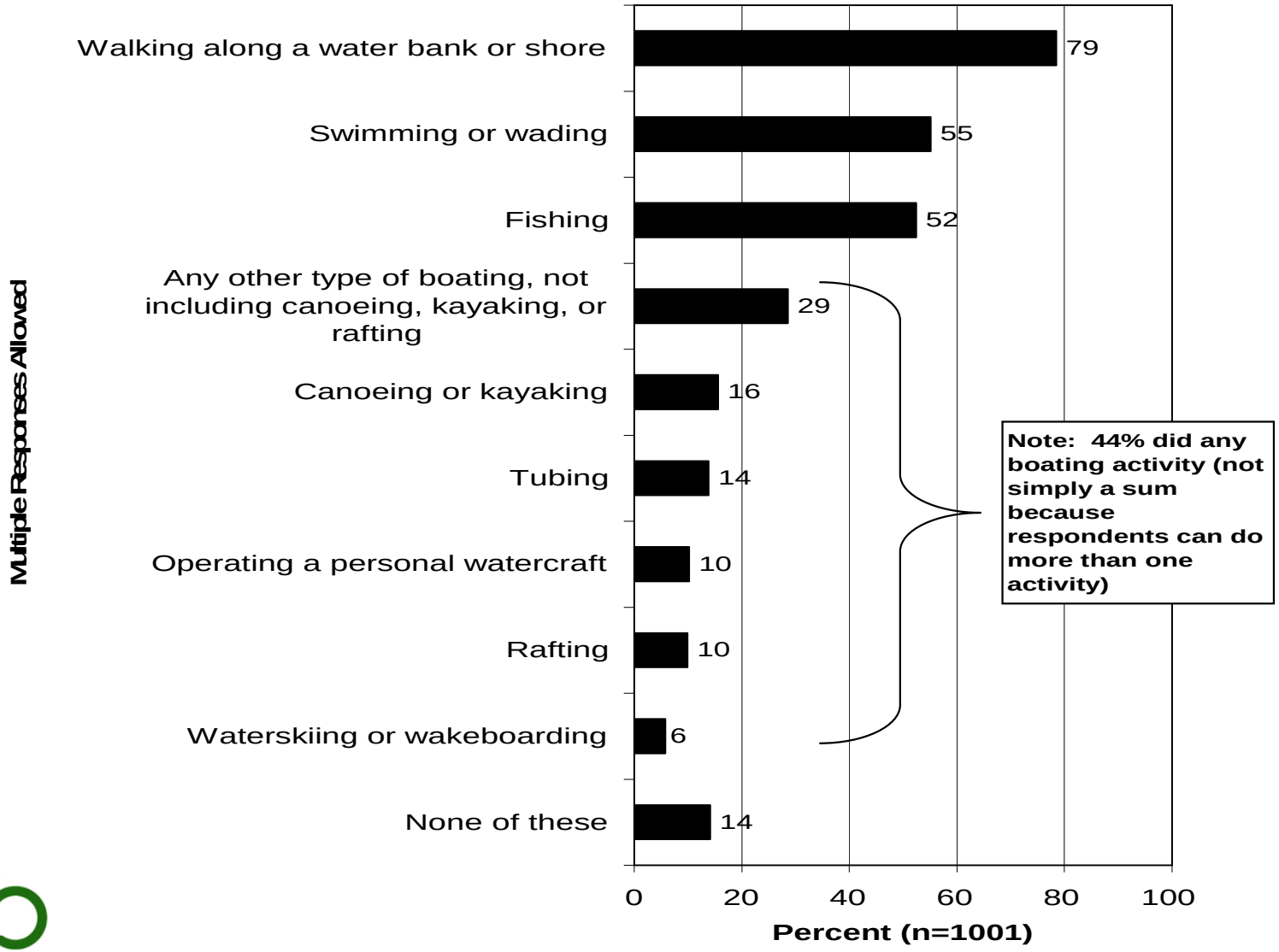
Photo: 2691

"How much is too much?"
Survey Results

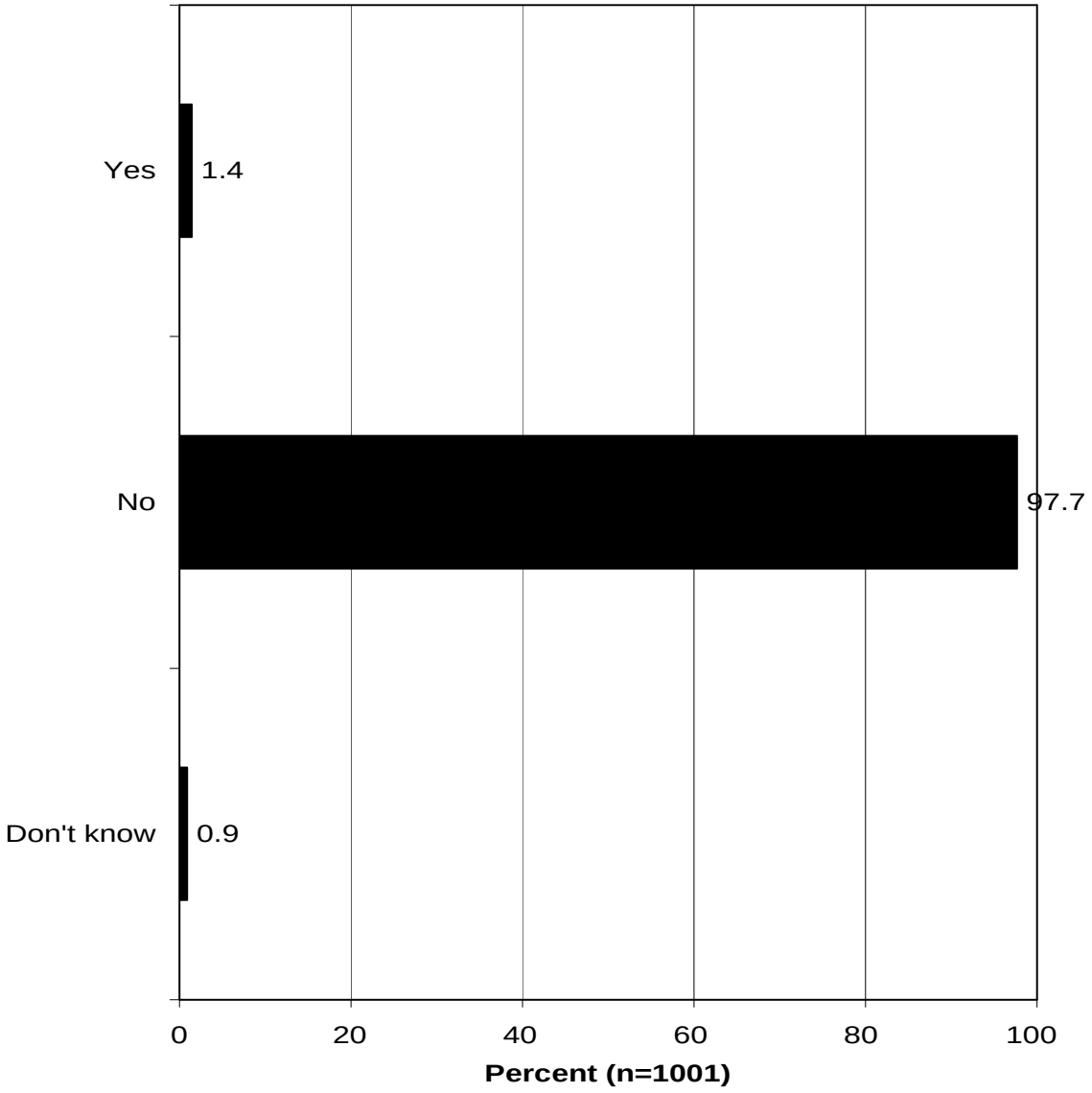
- Completed February/March 2012
- N = 1001
- Significant response to mailings
  - Surprising result

<u>(Lesson #2 - Stuffing envelopes = worth it)</u>

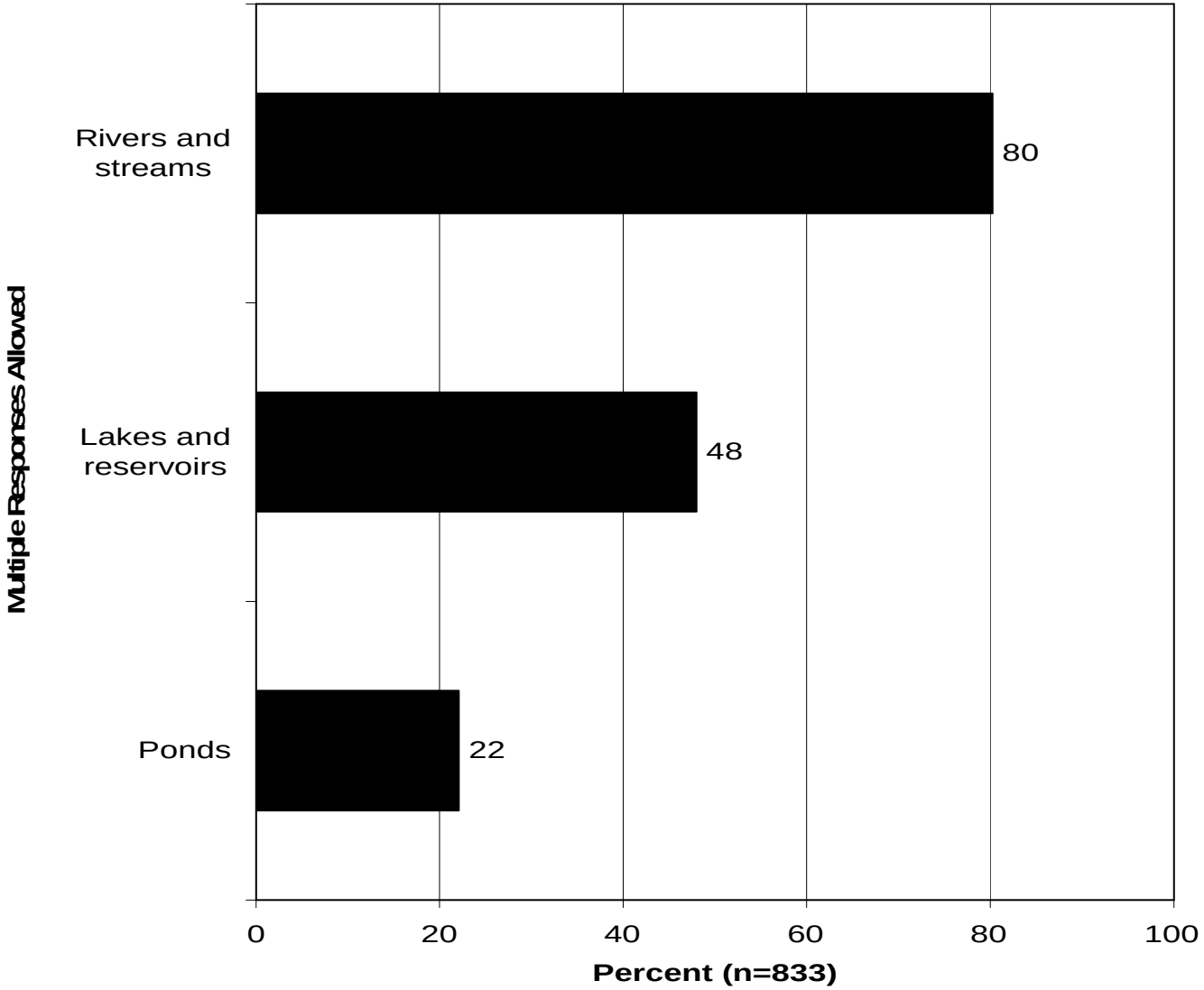
Q22. I would like to know if you personally participated in any of the following activities on or in West Virginia waters, including rivers and streams, lakes and reservoirs, and ponds, in the past 2 years.



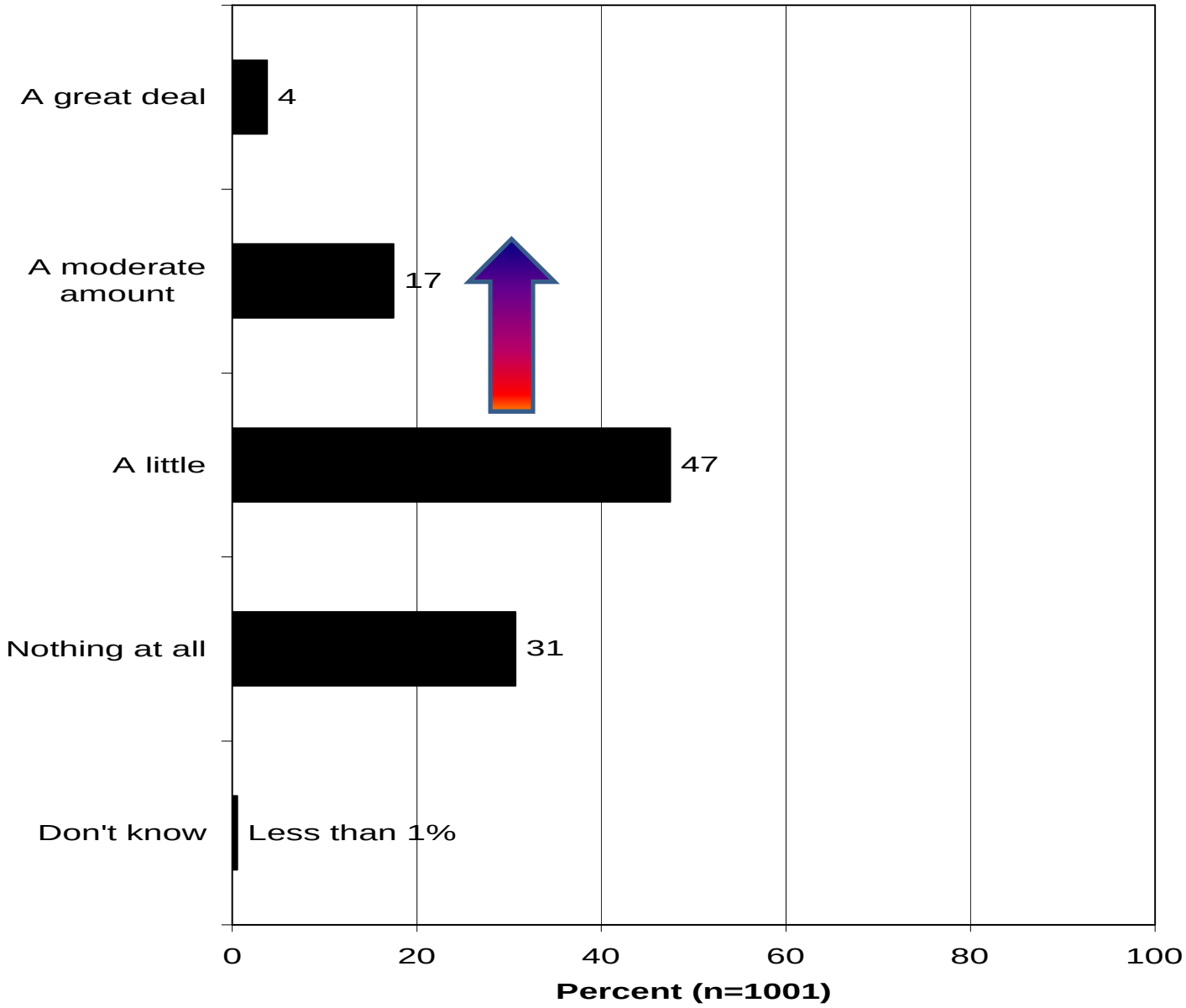
Q100. Do you or does anyone in your household currently work as an outfitter or guide on or associated with West Virginia waters?



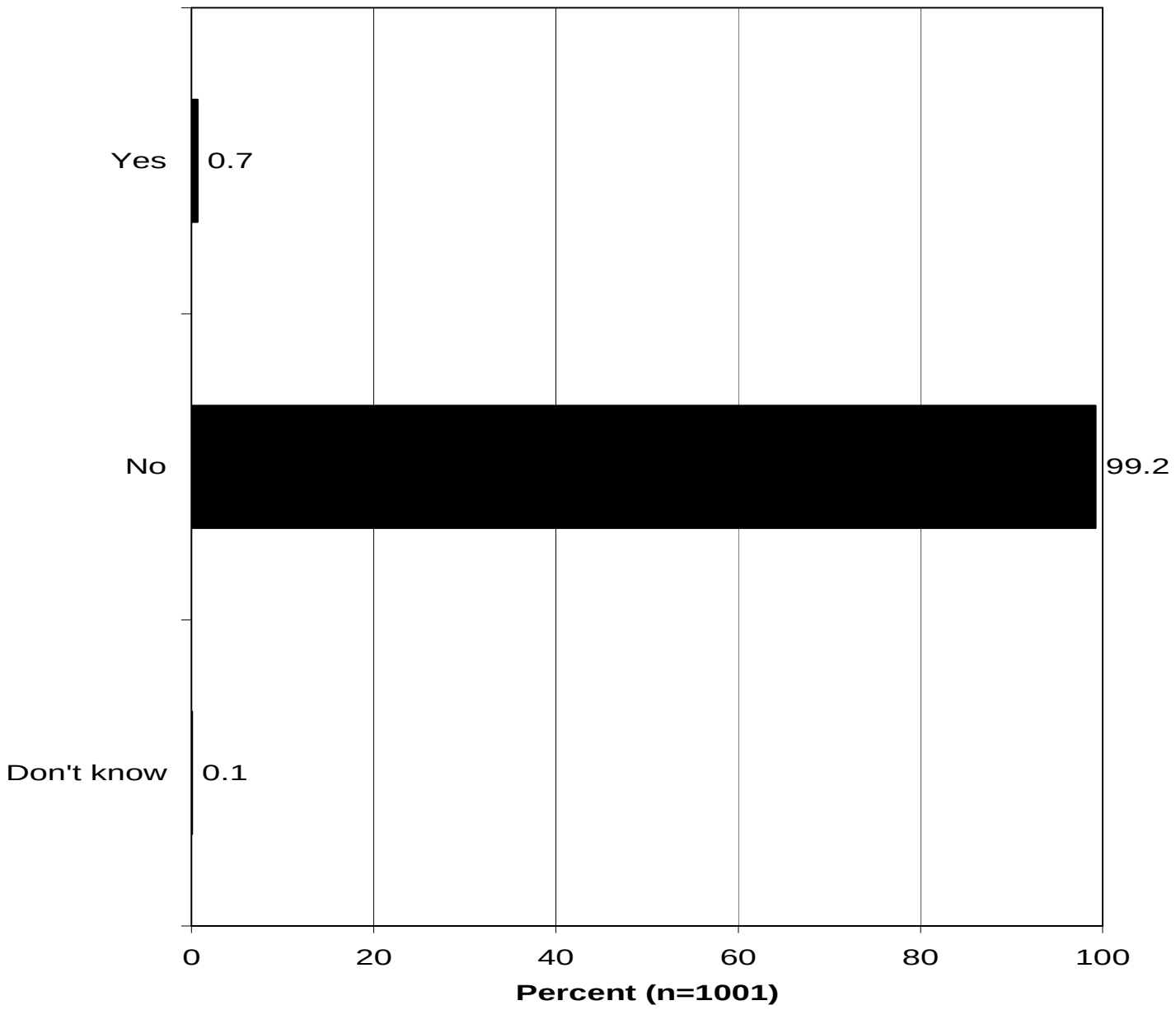
Q30. In which of the following types of water bodies did you participate in these activities in West Virginia? (Asked of those who participated in at least one activity on or in West Virginia waters in the past 2 years.)



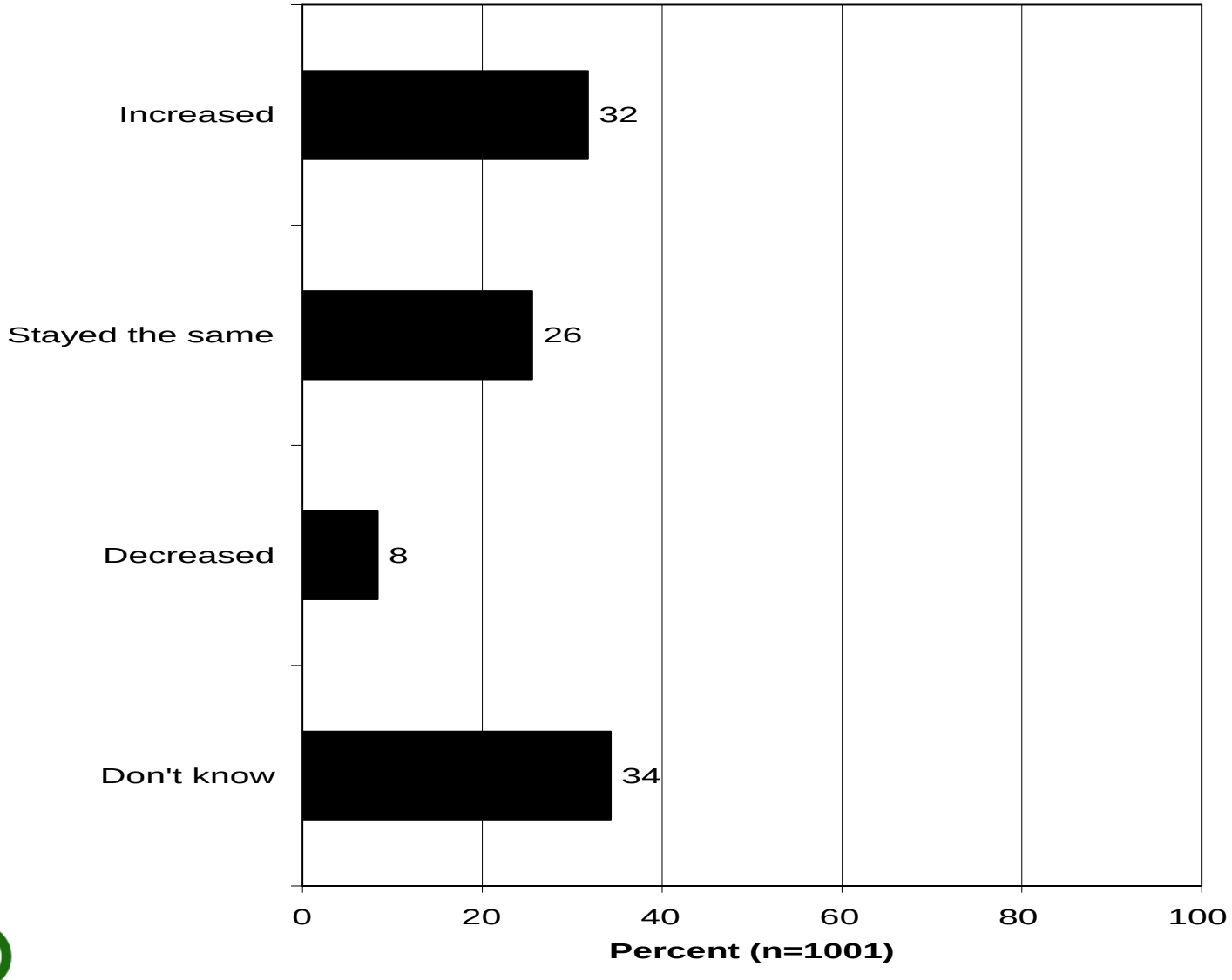
Q53. How much would you say you know about algae in West Virginia waters?



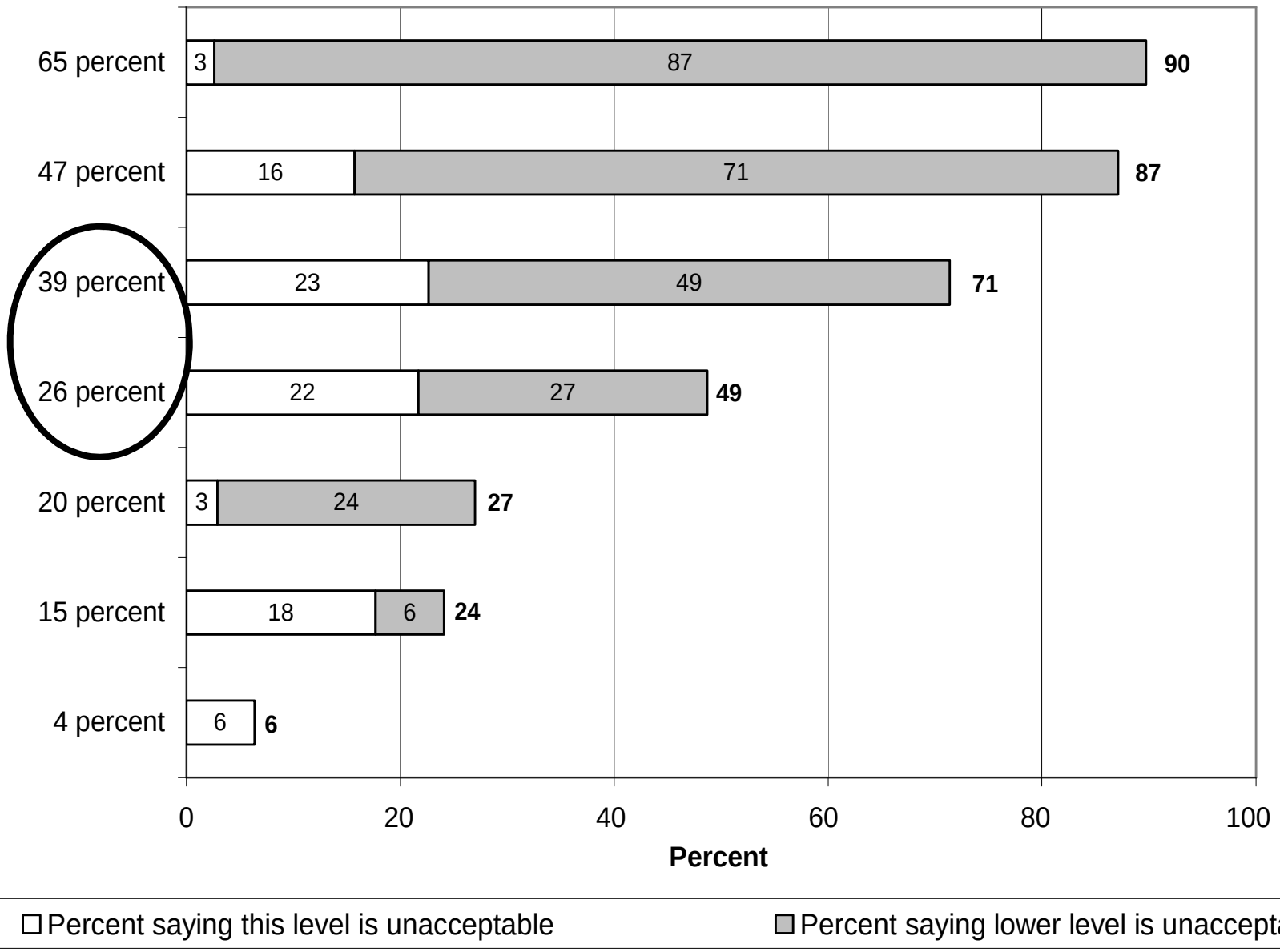
Q87. Have you contacted the DEP about algae in West Virginia waters in the past 2 years?



Q54. Would you say algae in West Virginia waters has increased, stayed about the same, or decreased in the past 2 years?



Percent Saying Algae Level Is Unacceptable



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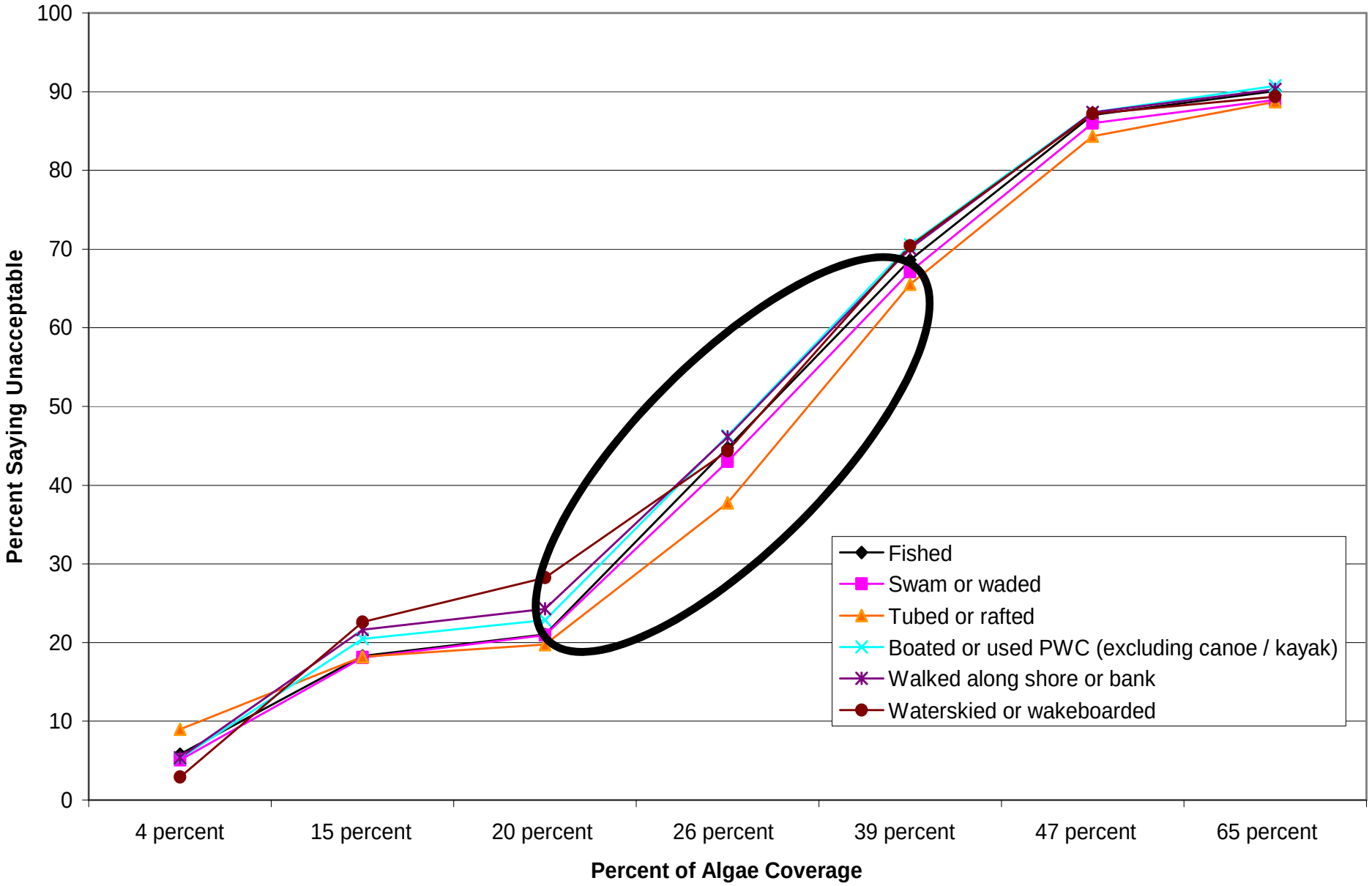

"How much is too much?" Utilizing Results…

- Report finalized – posted to WV DEP "Filamentous Algae" webpage
- Assessment

  Impairment = Yes, if:

  1. *Filamentous algae cover is >20% for 3 times the river width* ***or***
  2. *If >40% cover at any point (Regardless of length)*
  3. ***Special considerations*** *- if adjacent to public access point/camp/houses/etc… and >20% can be considered impaired (BPJ and/or reported to DEP)*

- *Greenbrier River Restoration Plan - TMDL Alternative 5R*

  Watershed specific NNC

“WV DEP Filamentous Algae”

http://www.dep.wv.gov/WWE/Programs/wqs/Pages/FilamentousAlgaeinWestVirginia