Chesapeake Watershed Education Scale-Up: A Partnership for Geographic and Environmental Science Literacy

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NOAA Environmental Literacy Grant

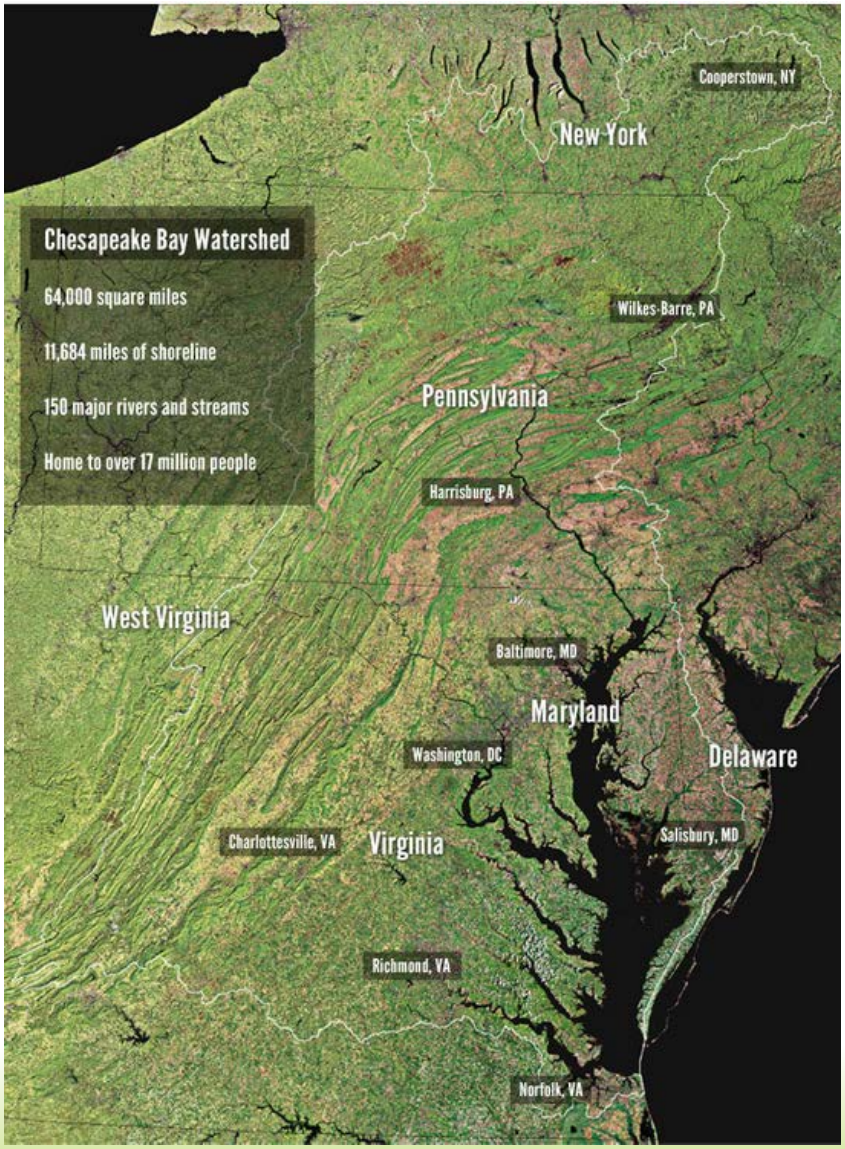
The Environmental Literacy Grants (ELG) program supports STEM learning by providing

funding for formal and informal education projects

implemented on **regional to national scales**,

with the goal **of increasing environmental stewardship** and

informed decision-making among public and K-12 audiences.*



* http://www.oesd.noaa.gov/grants/elg.html#page=about

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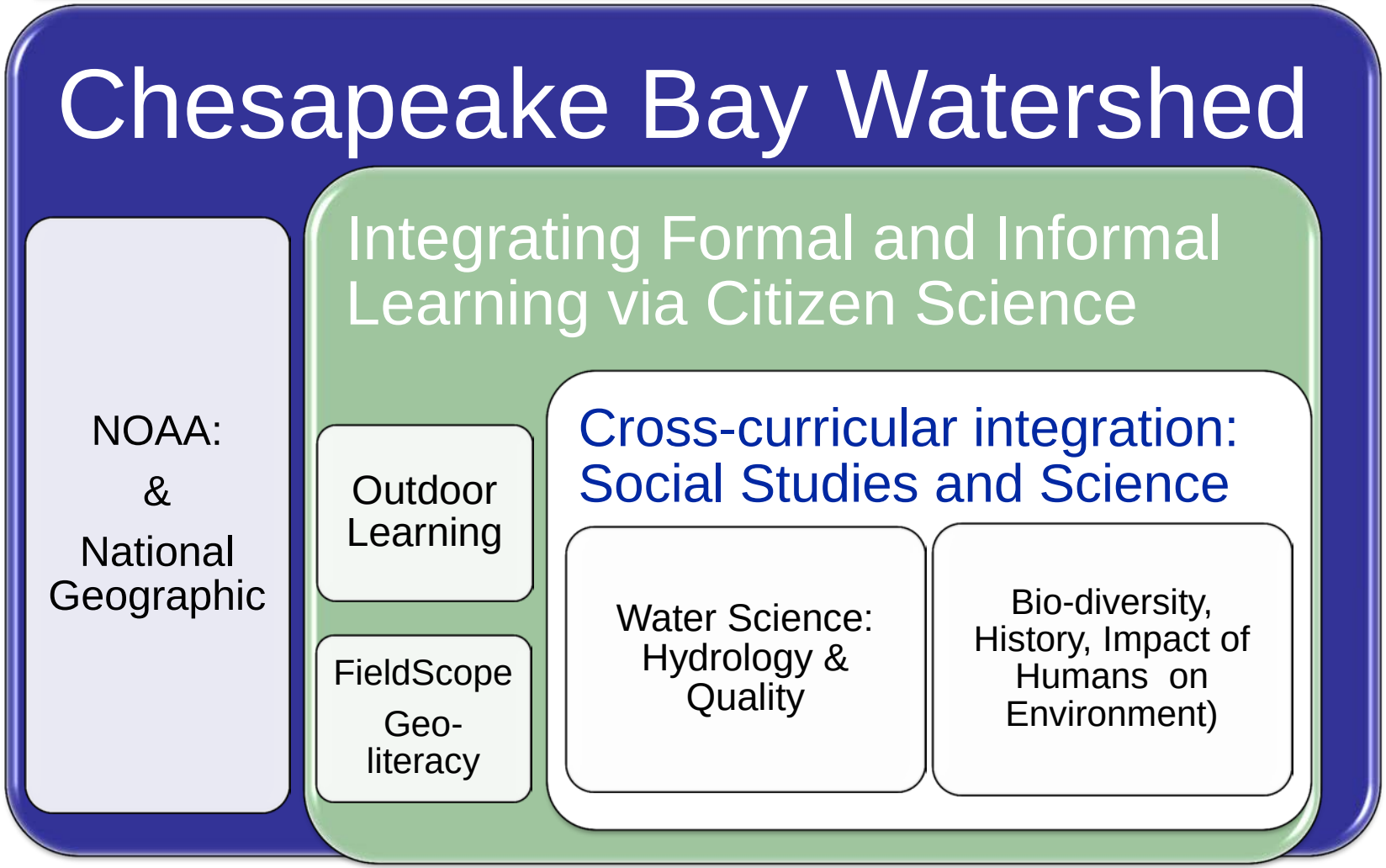
CBI Conceptual Framework



Program Complexity

- 8 jurisdictions and 8 sets of workshops x 2 years
- 2 program years with potentially different workshops
- Changing set of partners
- Teachers recruited in different ways: Yielded different cohorts in different states
  - Range K-11, mostly Middle School
  - Split between Science & Social Studies teachers

CBI Program Goals Drove Evaluation Questions

Goal 1. Capacity Building:

What new capacity do the participating organizations (Alliances, school districts, partners) develop over the course of the project to support teaching about watershed issues within the state?

Goal 2. Material Quality and Availability:

How does the availability of high-quality, state- and grade-appropriate watershed education materials change over the course of the project?

Goal 3. Educator Outcomes:

How does the professional development and implementation support offered by the partners in each state affect educator readiness, self-efficacy and intention to teach about the watershed?

Goal 4. Student Outcomes:

How many students received watershed education as a result of the project?

How does it affect their knowledge, skills, and attitudes?

Evaluation Components

Quantitative Data Collection

- Surveys
  - Year 1 Teachers
  - Year 1 Follow-up
  - Year 2 Teachers
  - Online course
- Online Course Analytics
- Counts
  - Organizations
  - Attendance
  - Artifacts
  - Teacher demographics

Qualitative Data Collection

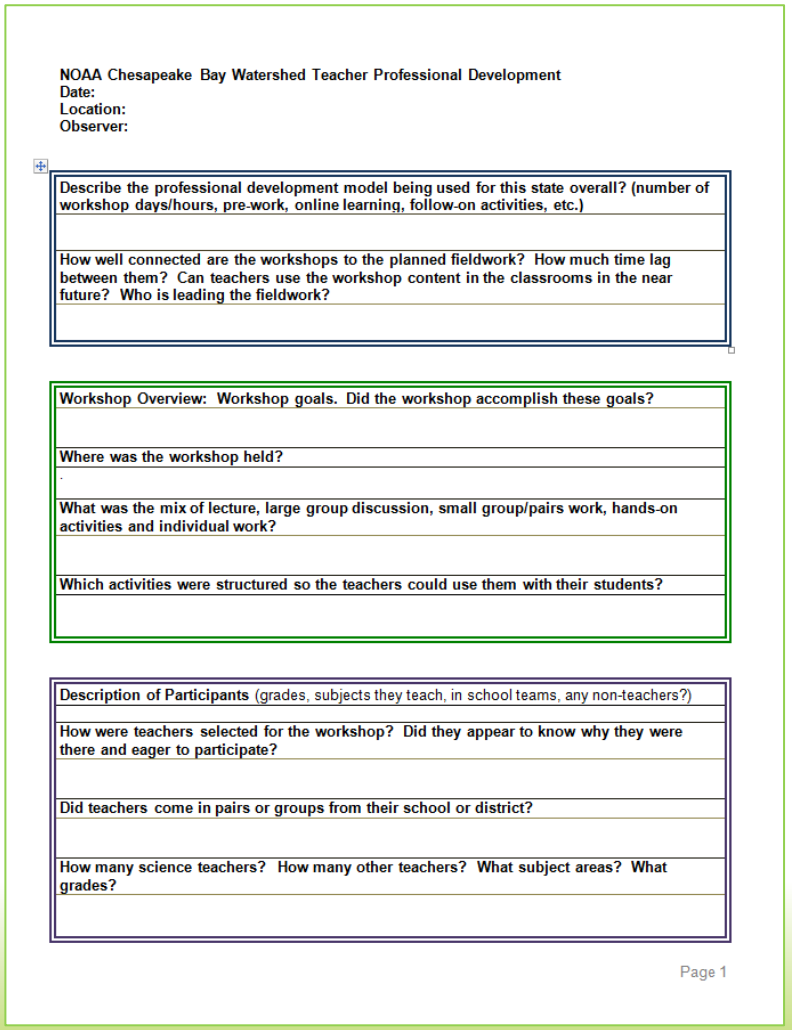
- AC Interviews
- Teacher Workshops
  - Observations
  - Feedback Forms
  - Micro Interviews of Select Teachers
- Classrooms
  - Observations
  - Interviews
- Artifact Analysis
  - Lessons
  - Student evidence

Evaluation Goals By Data Collection Method

	Capacity Building & Collaboration	Material Quality and Availability	Educator Outcomes	Student Outcomes
Online Course	# Teachers trained # Students taught State collaborations	Online Course Content Linking to NOAA resources	Quizzes Online Analytics Session Surveys Assignments	Year-end surveys Teacher Interviews
Face-to-Face Workshops	Workshop Feedback	Workshop Feedback	Workshop Feedback	Year-end survey Teacher Interviews
Outdoor Activities	Partnerships built		Observations Year-end survey	Observations Year-end survey
Program as a Whole	4 AC Meetings Counts/reach AC Survey AC Interviews Year-end survey	AC Survey Year-end survey Artifact Analysis	Classroom observations Teacher Interviews Year-end survey	Classroom observations Follow-up survey Year-end survey

Evaluation Instruments Developed

- Surveys
  - Alliance/Partner Feedback Survey
  - Workshop Teacher Feedback Form
  - End-of-year surveys
  - Year 1 Follow-up Survey
  - Year 2 background data survey
  - On-line course session feedback
- Other
  - Workshop Observation Form
  - Alliance/Partner Interview protocol
  - Teacher interview protocol



NOAA Chesapeake Bay Watershed Teacher Professional Development
Date:
Location:
Observer:

Describe the professional development model being used for this state overall? (number of workshop days/hours, pre-work, online learning, follow-on activities, etc.)
How well connected are the workshops to the planned fieldwork? How much time lag between them? Can teachers use the workshop content in the classrooms in the near future? Who is leading the fieldwork?

Workshop Overview: Workshop goals. Did the workshop accomplish these goals?
Where was the workshop held?
.
What was the mix of lecture, large group discussion, small group/pairs work, hands-on activities and individual work?
Which activities were structured so the teachers could use them with their students?

Description of Participants (grades, subjects they teach, in school teams, any non-teachers?)
How were teachers selected for the workshop? Did they appear to know why they were there and eager to participate?
Did teachers come in pairs or groups from their school or district?
How many science teachers? How many other teachers? What subject areas? What grades?

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KEY EVALUATION QUESTIONS & FINDINGS

Goal 1: Capacity and Community Building

- Organizational Capacity
  - National Geographic
  - State Geographic Alliances
  - Partner Organizations
  - State Organizations
- Individual Capacity
  - Alliance Coordinators
  - Teachers
  - Students
- Development of a Geo-Literate Conservation Community
  - Cross-institutional, cross-state
  - Teacher Professional Learning Communities

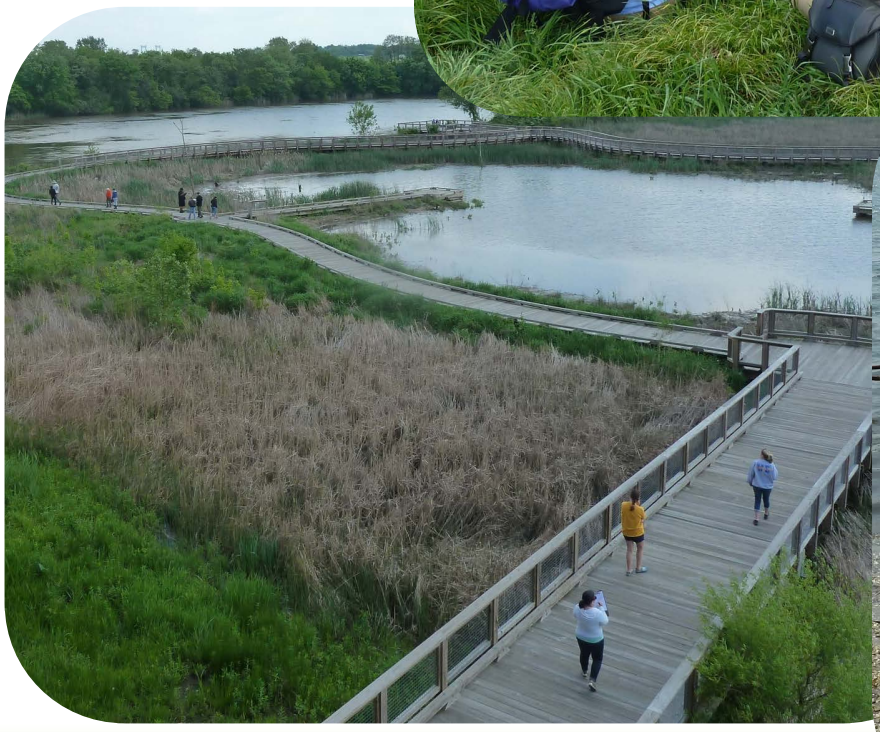
Goal 2: Material Quality and Availability

- Evaluation mostly ad hoc
- Mix of materials developed by the states and National Geographic for the program
  - Some states created large bound books
- Identification of existing resource repositories
- States effectively used existing materials, some were freely available, others copyrighted and not shareable
- Some sharing across states on individual basis and through Google Site

Goal 3: Educator Outcomes

- Positive, positive, positive responses in surveys, interviews, observations
- Teachers were excited; many said this was the best PD they have taken
- Built relationships within & across schools/districts
- Most planning to teach the content
- Very high percentages shared the content to teachers in & out of their schools, in & out of their subjects areas

And Teachers Outdoors



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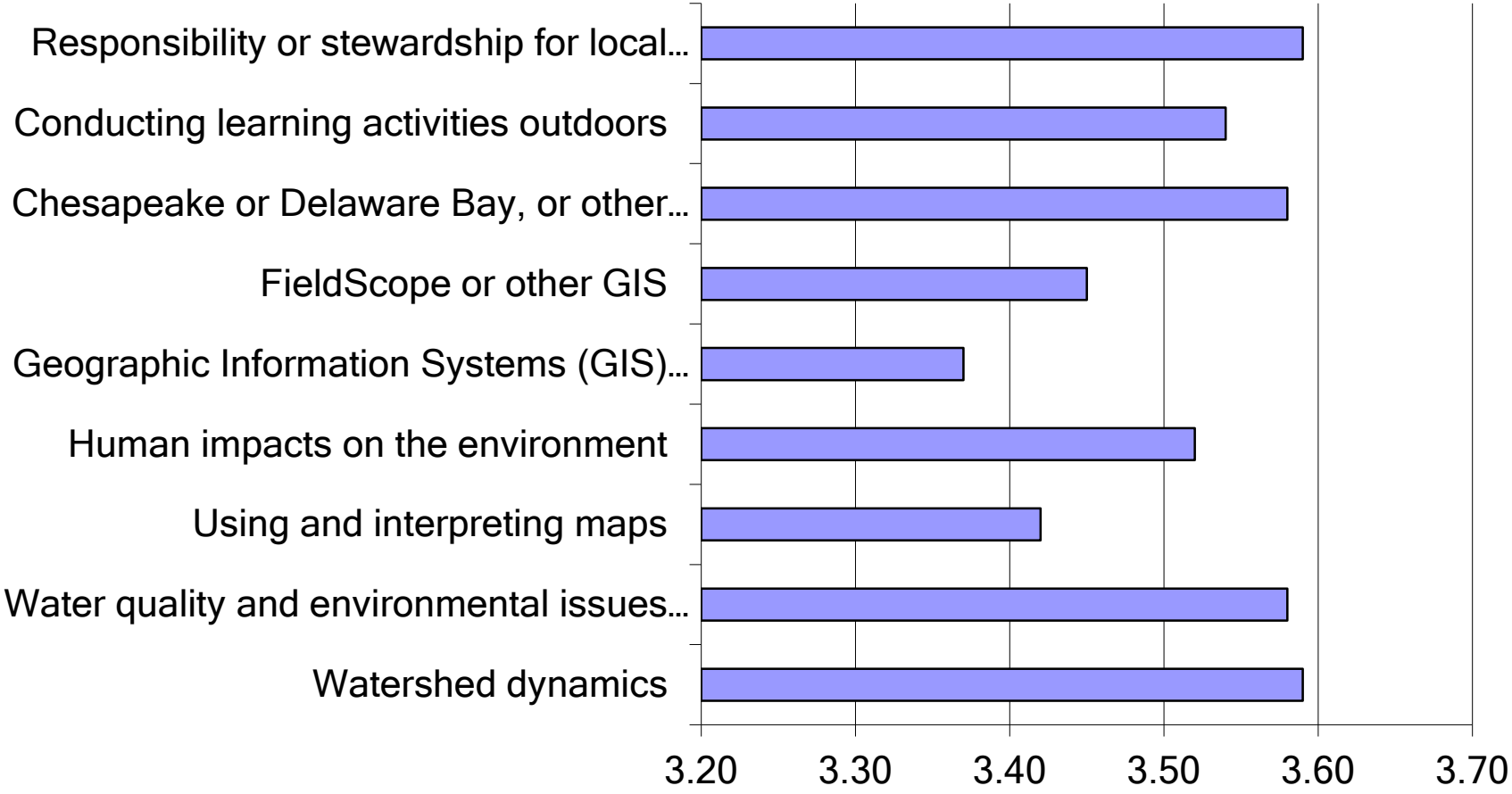
As a result of these professional development activities, **how much did you learn** about



4-point scale (Topic not cover…I learned a lot)

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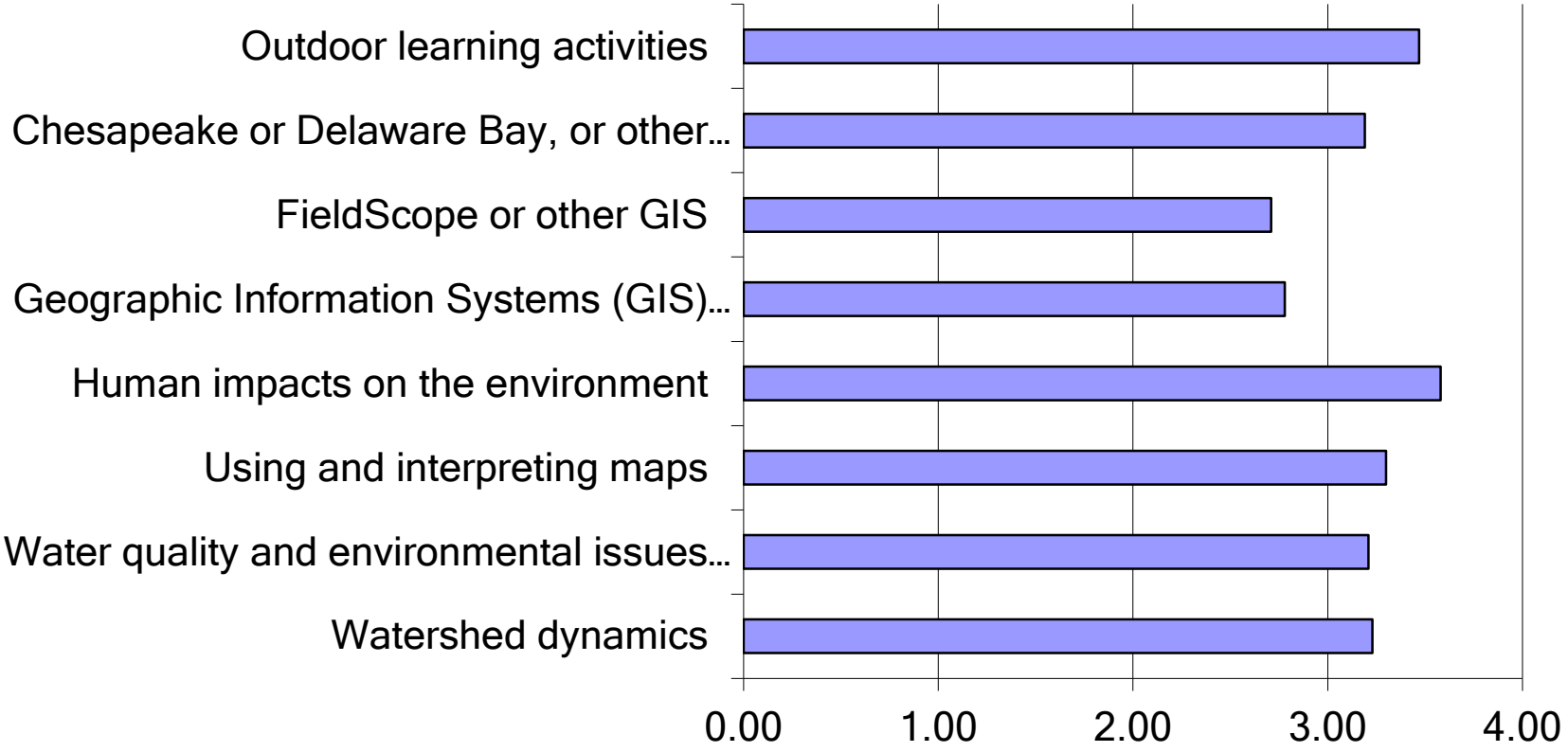
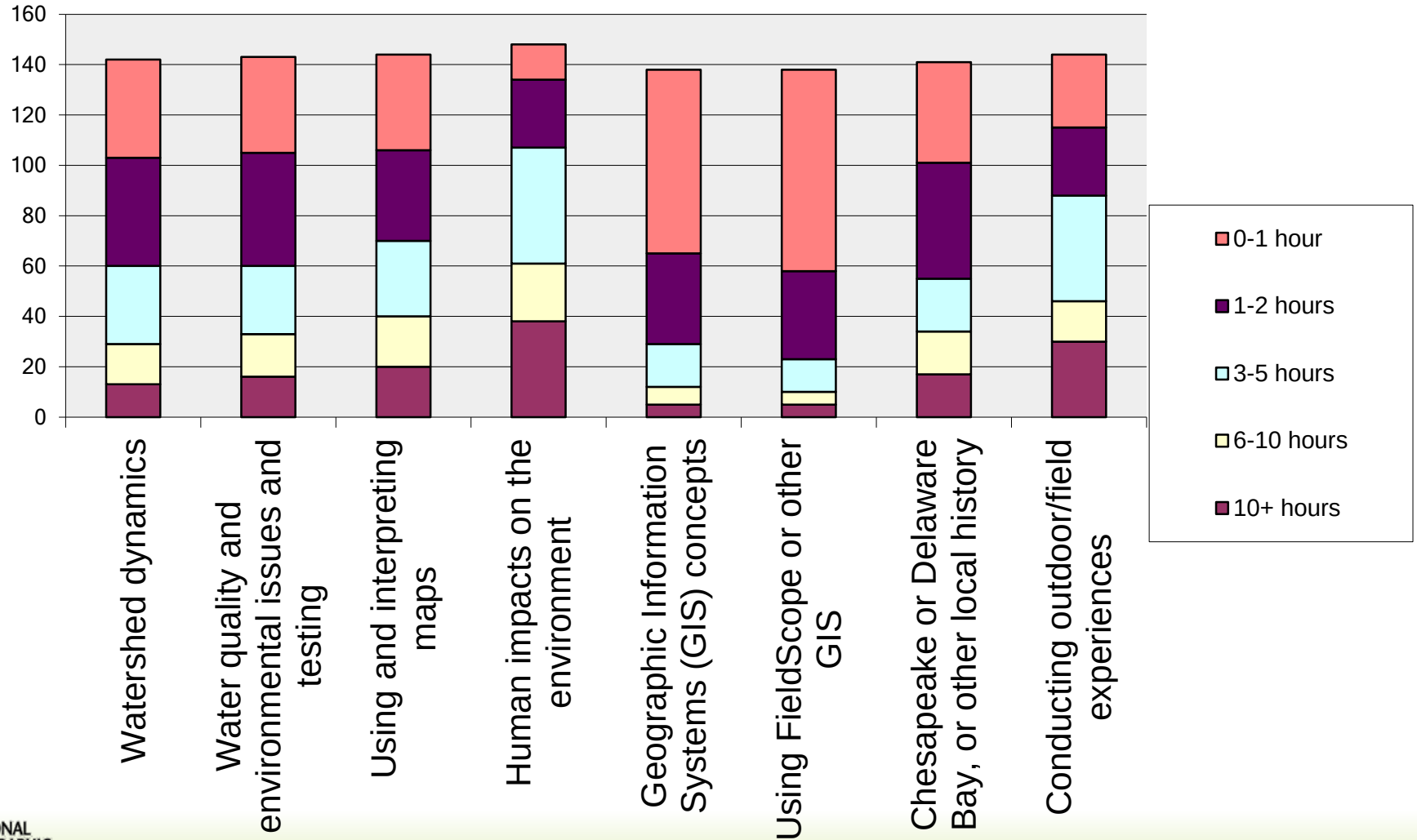
As a result of these watershed activities, **how prepared do you feel to teach** this content to your students?



1 = Not adequately prepared	2 = Somewhat prepared	3 = Fairly well prepared	4 =Very well prepared

How much time did you spend teaching the content you learned?



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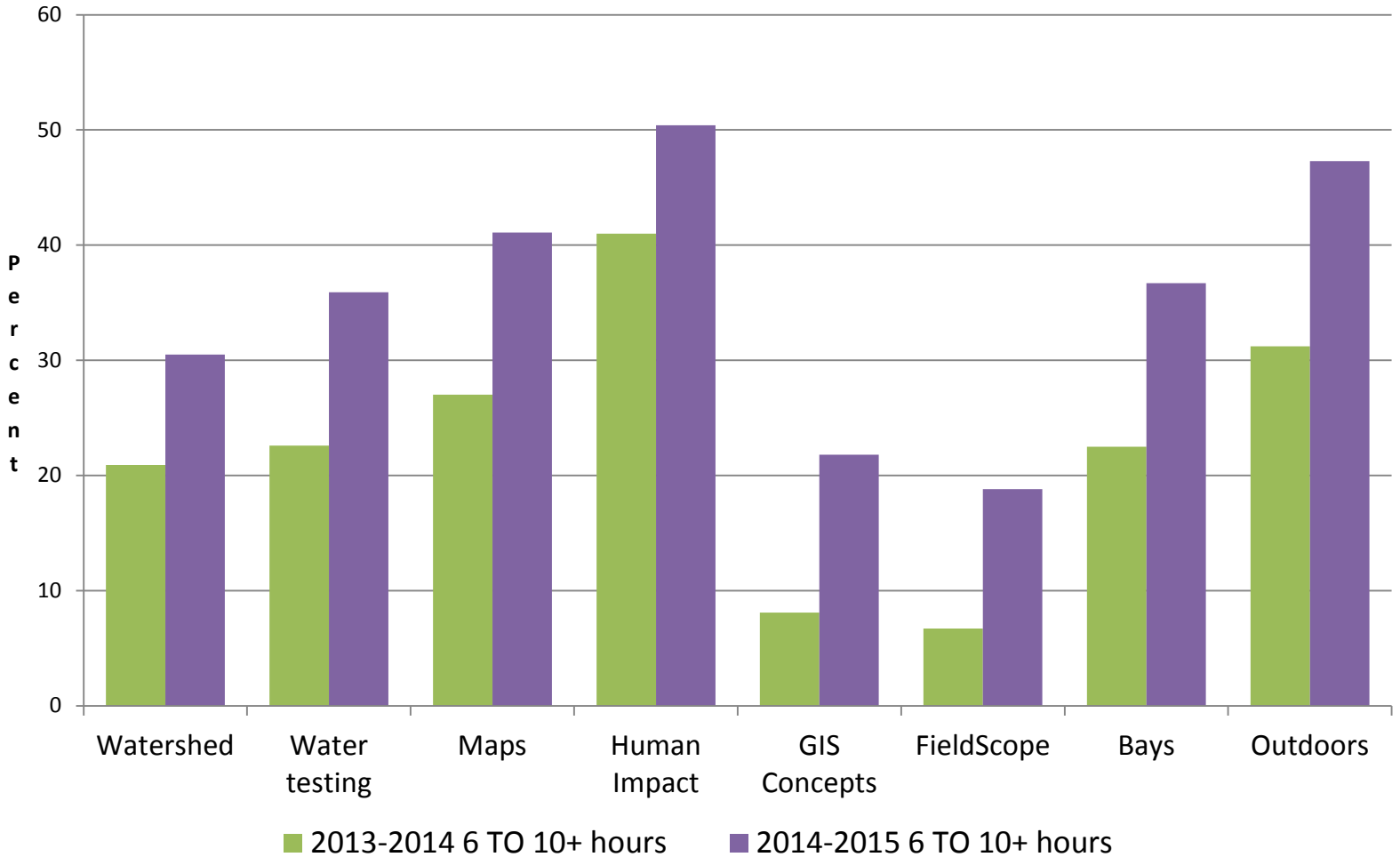
Educator Outcomes: Time Teaching Content Comparing School Year 2013 to 2014



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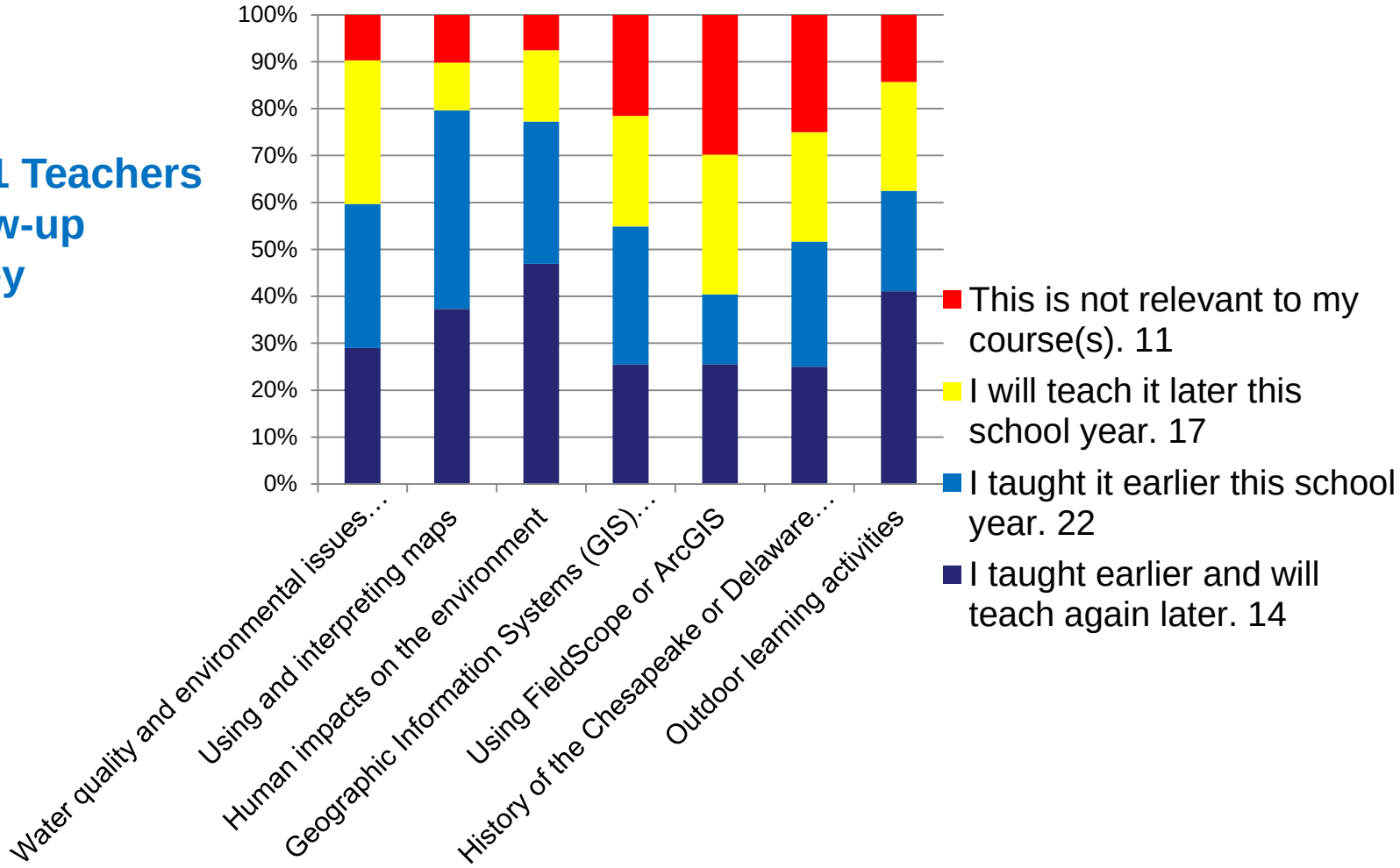
What content that you learned in last year's PD, have you taught or will you teach this year?

Year 1 Teachers Follow-up Survey



Qualitative Questions

- Prior to your participation in this PD program, describe how you taught about the Chesapeake Bay, Delaware Bay or your local watershed and other topics.
- As a result of this professional development program how have you or will you change your teaching related to the Chesapeake Bay, Delaware Bay, your local watershed, and other topics?
- Please describe any outdoor watershed-related activities you did with your students related to this grant.
- Describe examples of teaching this watershed content in your classroom this school year (Topics/Activities)?
- Thinking about the online course sessions (Face-to-Face) you participated in, which topics or activities had the biggest impact on you and why?

Examples of Educator Responses

BEFORE I was basically using a book or some type of literature to introduce this content to my students. I did not involve my students with a lot of hands lessons.

AFTER: I am able to provide many more meaningful outdoor experiences for my students, I am more confident in my background knowledge and I have many more resources and better activities planned.

I have looked closer at the long term effects of actions by humans…on the watershed. Before the class I never realized all the ways they can be effected, even little actions can have huge negative consequences.

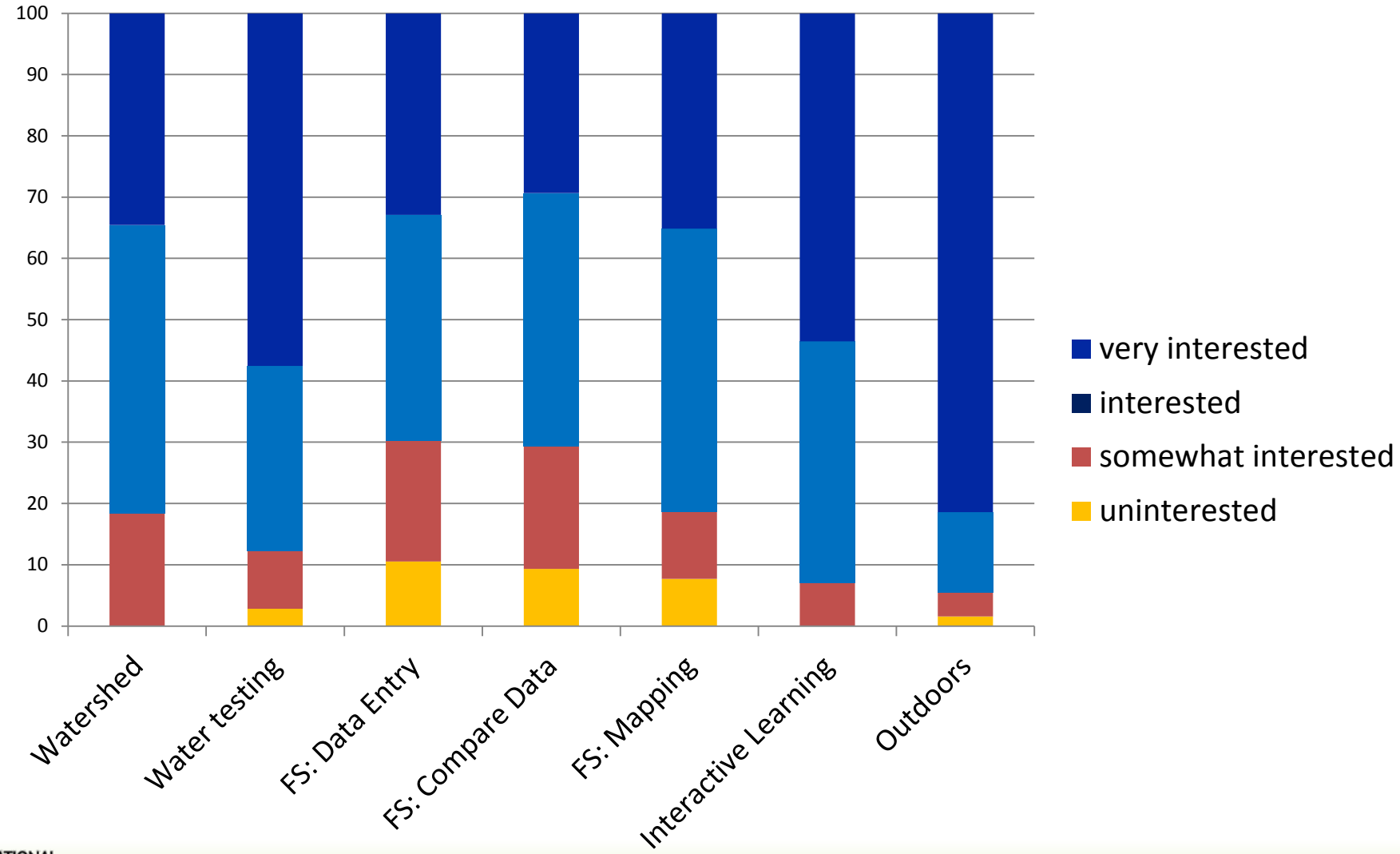
Through the plan I had my 82 students spend a morning session inside learning spacial/global awareness through various map activities and field scope. Then we spent the afternoon outside exploring the Susquehanna River including water quality, macros, pollutants, and buffers.

Digital activities and the website from NOAA regarding the history of the bay and impact on the watershed.

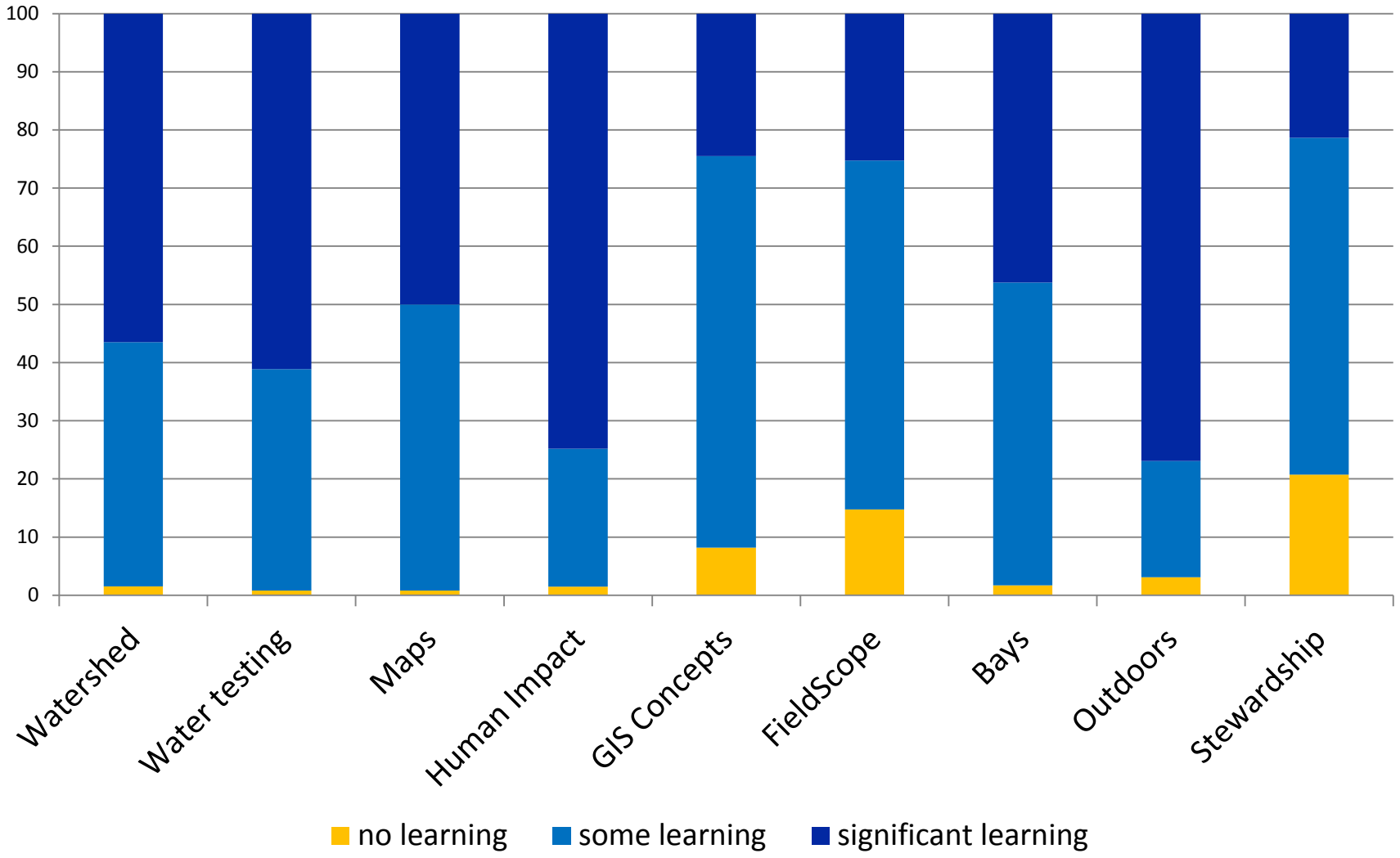
It is easier to make lessons that incorporate all the subject areas now that I have been exposed to how [to teach] the Chesapeake Bay influences math, science, reading and social studies.

Goal 4: Student Impacts

Student Outcomes: Student Engagement



Student Outcomes: Student Learning



Student Outcomes: Qualitative Questions

- Please describe any outdoor watershed-related activities you did with your students related to this grant. For example, did you take them on a field trip? Do a local activity? Do any water quality or environmental testing?
- How did your students react to the outdoor activity? What were key concepts and ideas they learned?
- How have your students changed as a result of your participation in this NOAA grant? (Interest in the Bay or local watershed, science, stewardship, etc.)

Evaluation Lessons Learned

- Successes:
  - Lots of rich data
  - Multiple sources of data allowed us to triangulate outcomes
  - Partnerships of all kinds can be valuable

- Challenges
  - Timing is everything! PD often held at the end of school year so could not measure impact
  - 8 jurisdictions with a lot of freedom over 2 years creates 16 possible scenarios
  - There is such a thing as TMD (too much data)
  - Identifying *best practices* is non-trivial

Thank you!

For additional information please contact:

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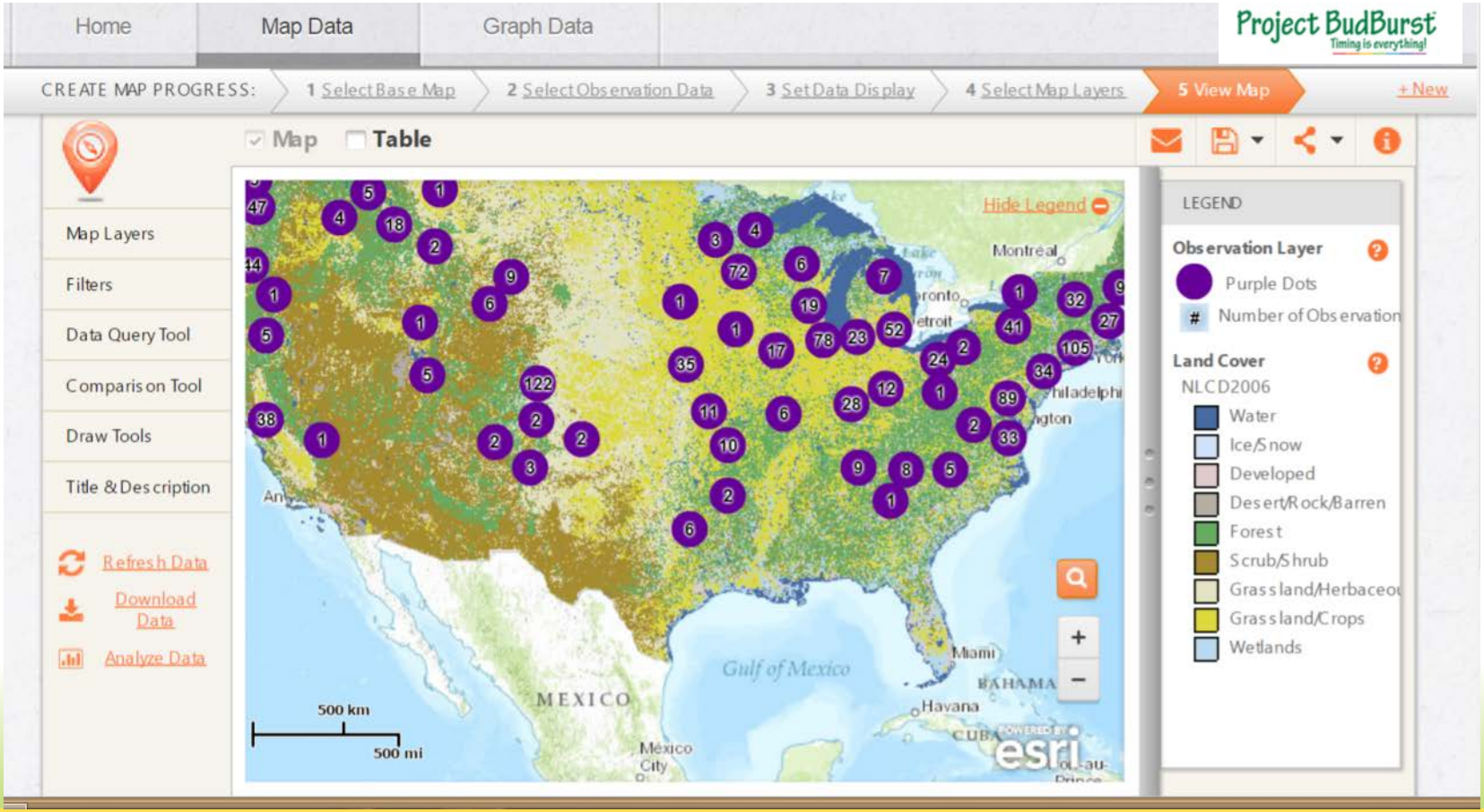
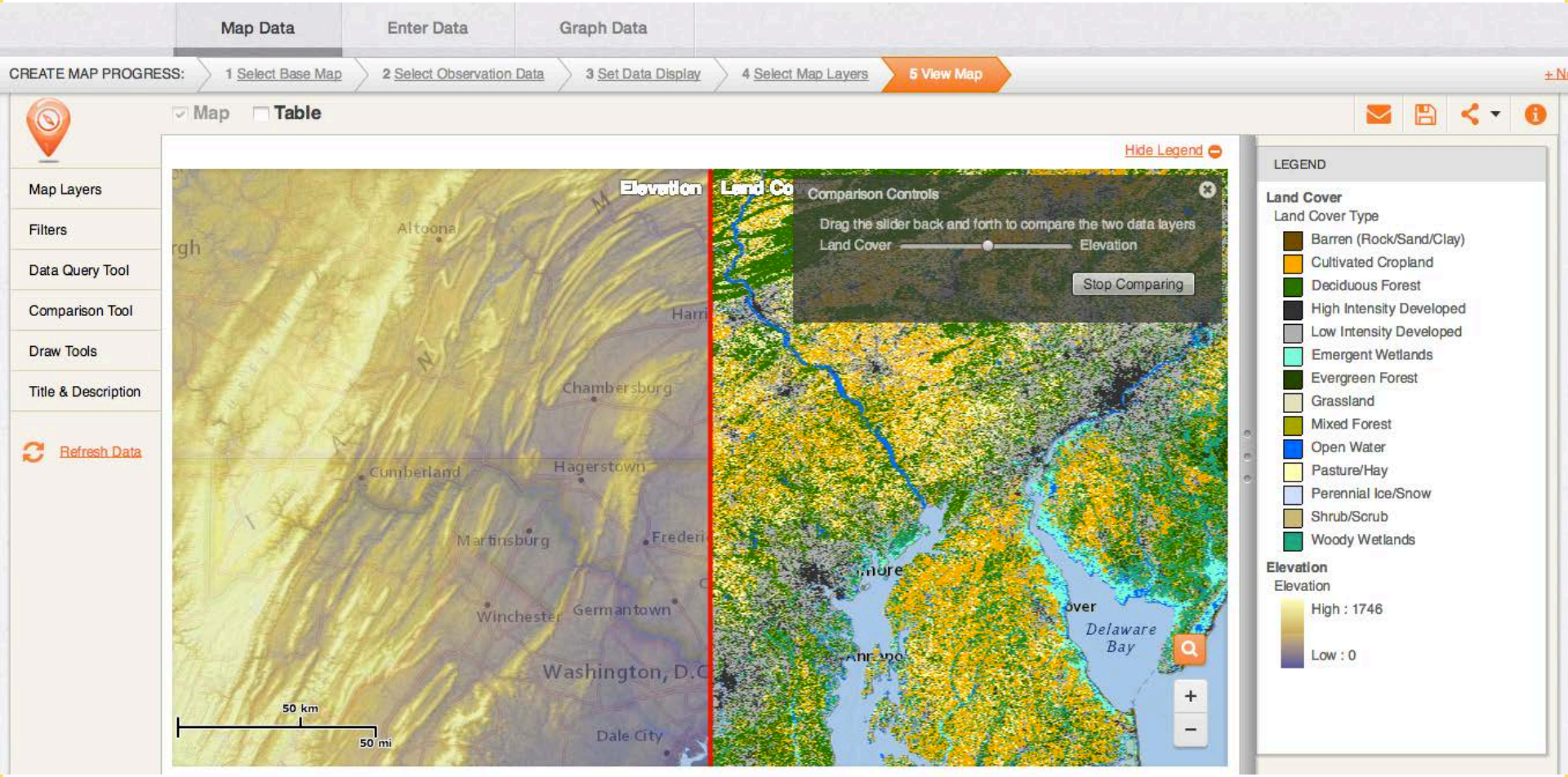
What is FieldScope?

- Free, online Geographic Information System that
- Provides for citizen scientists, educators, students
- Tools to enter, map, graph, and analyze data.



FieldScope Graphing Data: Map Layers



FieldScope Graphing Data: Data Analysis Tools