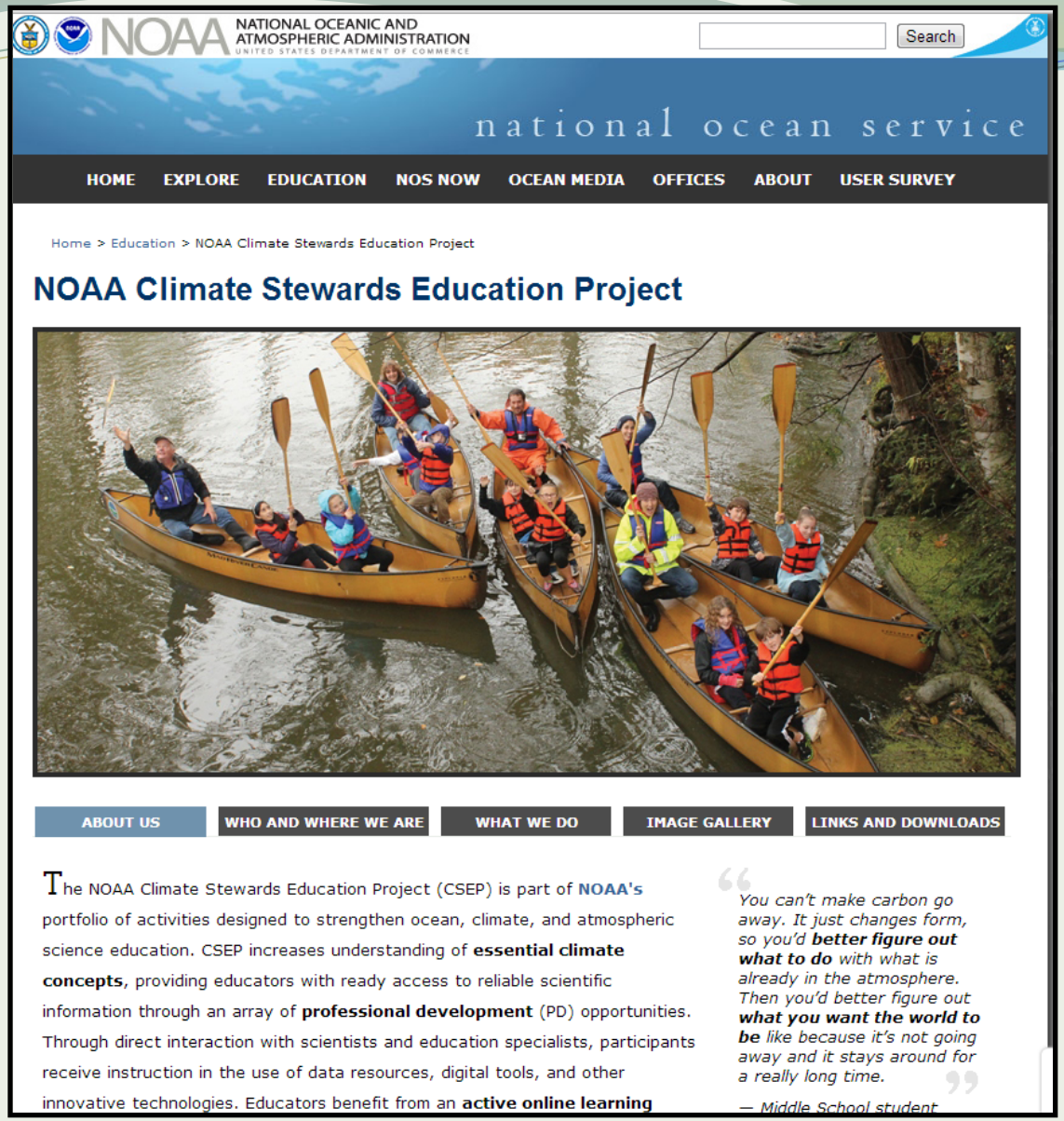
NOAA Climate Stewards

"You can't make carbon go away. It just changes form, so you'd better figure out what to do with what's already in the atmosphere. Then you'd better figure out what you want the world to be like, because it's not going away, and it stays around for a really long time."

6th grade student

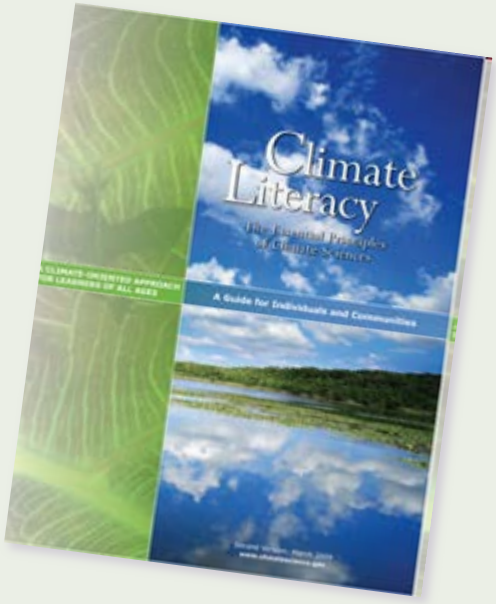


oceanservice.noaa.gov/education/climate-stewards

NOAA Climate Stewards

Build Climate Literacy for educators to:

- ***understand*** the concepts of climate
- ***assess*** the scientifically credibility of information
- make ***informed*** and ***responsible*** decisions, and ***initiate*** **actions** in the community



NOAA Climate Stewards

Provides Educators:

- ***Sustained*** professional development
- ***STEM*** and geography based teaching and collaborative tools
- ***Digital*** content resources
- ***Contextual-based*** teaching applications

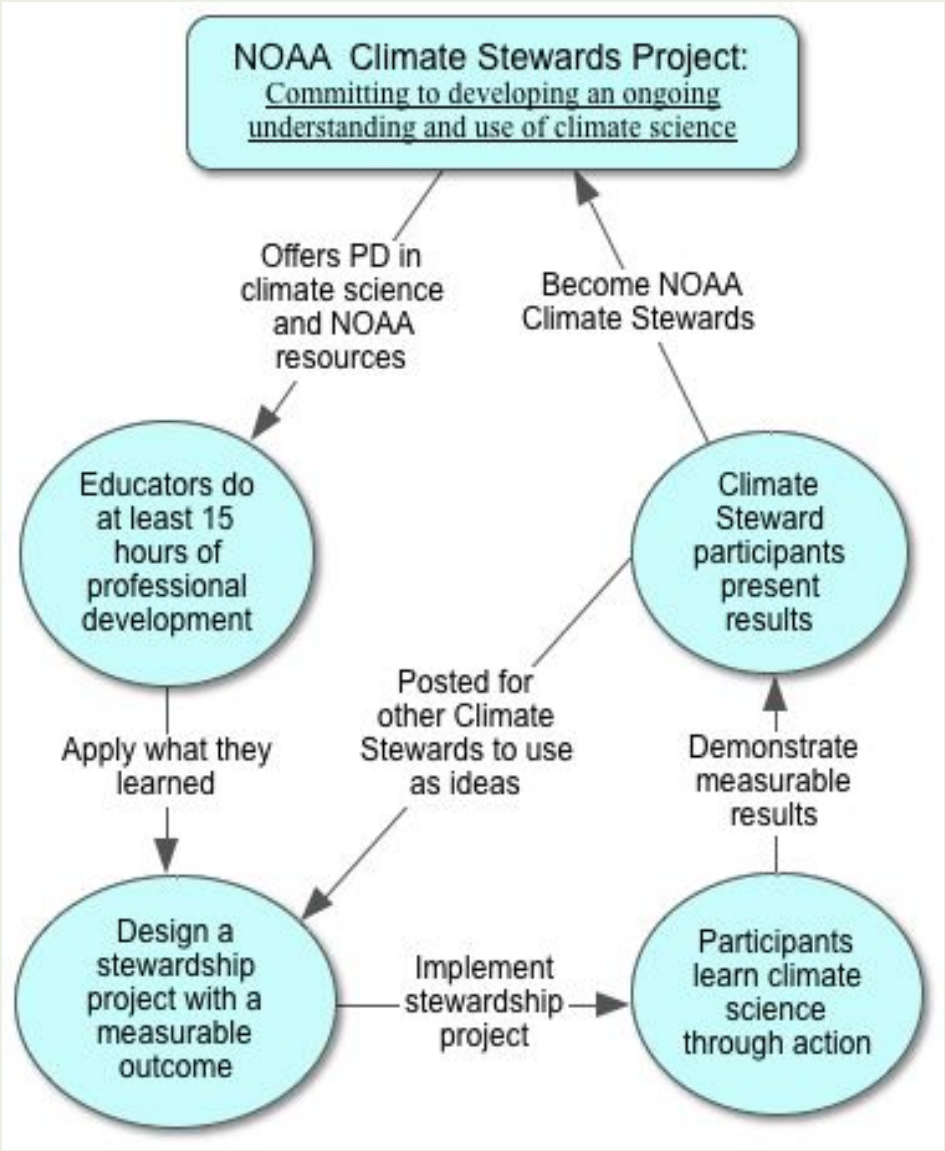
Leadership Team

Project Reach

200 Educators from 46 states, DC, Puerto Rico, USVI

Formal and Informal Educators – Elementary through College

NOAA Climate Stewards Process



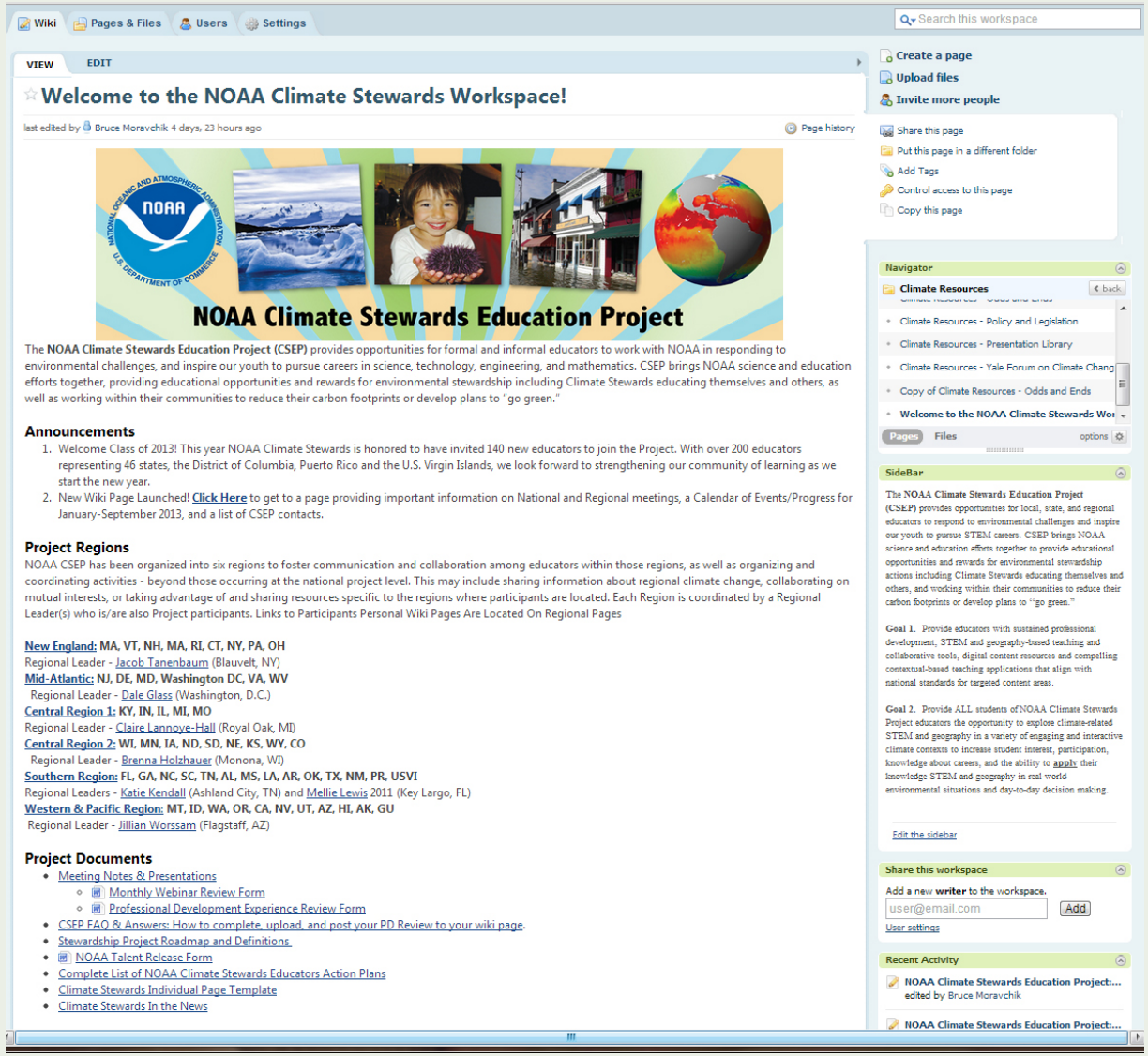
Expectations for Participants

- Complete at least **15 hours** of Professional Development training
- Complete of at least **9 hours** of PD training for each additional year in the Project.
- Participate in **monthly** webinars and regional events.
- Develop and Implement a **climate stewardship project** in their school, community, or organization, focused on mitigating the effects of climate change.
- Use the **CSEP Wiki** to post PD reflections, classroom activities in climate change, stewardship project plans, progress updates
- Participation in **CSEP evaluation efforts**.

Benefits for Participants

- **Mini-grant funding** to develop and implement a climate stewardship action plan.
- **Travel stipends** to attend and present at key professional development conferences.
- **Special contests** with monetary and educational resource prizes.

Organizing & Collaborating



Professional Development: Monthly Webinars

Climate Controversy in the Classroom – Susan Buhr

Climate Change and the American Mind – Andy Leiserowitz

Tools for Investigating Estuaries – Bree Murphy

Climate Change Impacts on Human Health – Amy Work

Sea Level Change – Past, Present, Future – Stephen Gill

Ocean Acidification – Paulo Maurin

NSTA Opportunities

Symposium: NOAA Climate Data in the Classroom

Saturday Workshops

- Climate Education and NGSS
- Lessons from Antarctica: Polar Ice Cores and Climate Research
- Lunch with Climate Scientists
- ClimateChangeLIVE!: Webcasts and Education Resources
- NOAA's Climate Stewards: Affecting Change in Your Community
- Discover Your Changing World With NOAA - New Hands-on Climate Activities!

Regional Workshops

2012

- Aldo Leopold Nature Center – Monona, WI
- New York Hall of Science – Queens, NY
- Norrie Point Environmental Center – Staatsburg, NY
- Flagstaff Festival of Science – Flagstaff, AZ

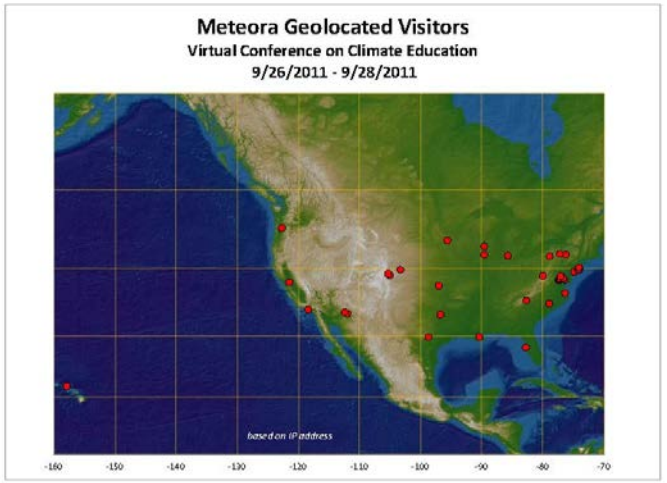
2013

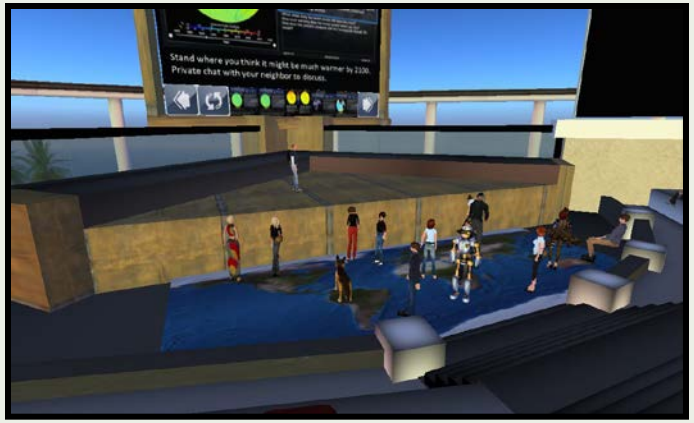
- April, 2013 Traditional Environmental Knowledge
  National Museum of the American Indian
  Washington, DC

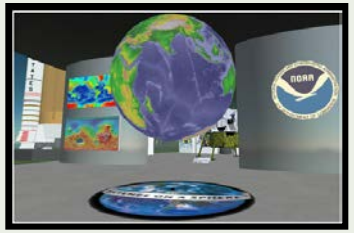
Using Virtual Platforms

- Virtual Climate Conference

  3 evenings, Fall 2012
- Introductory training: construct an avatar, how to move/communicate
- Climate content, discussion groups, exploration of NOAA island

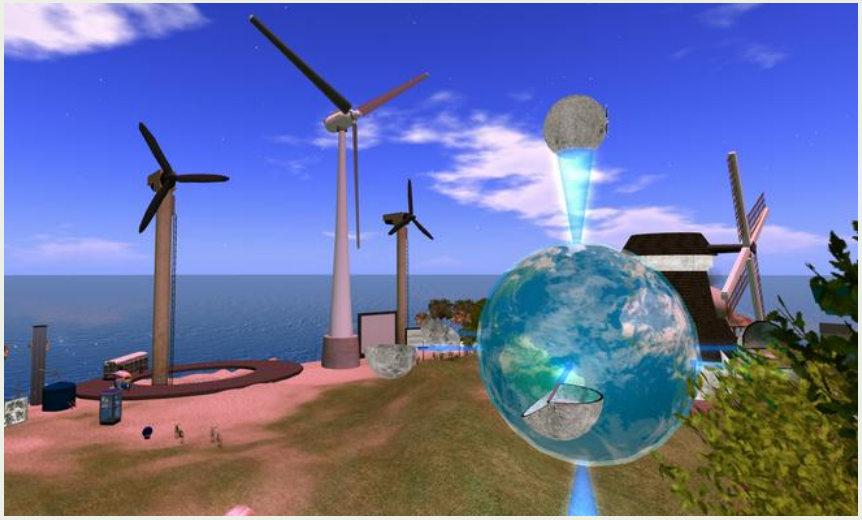






Book Discussions/Field Trips

OneClimate Island Shelter



Stewardship Project Development

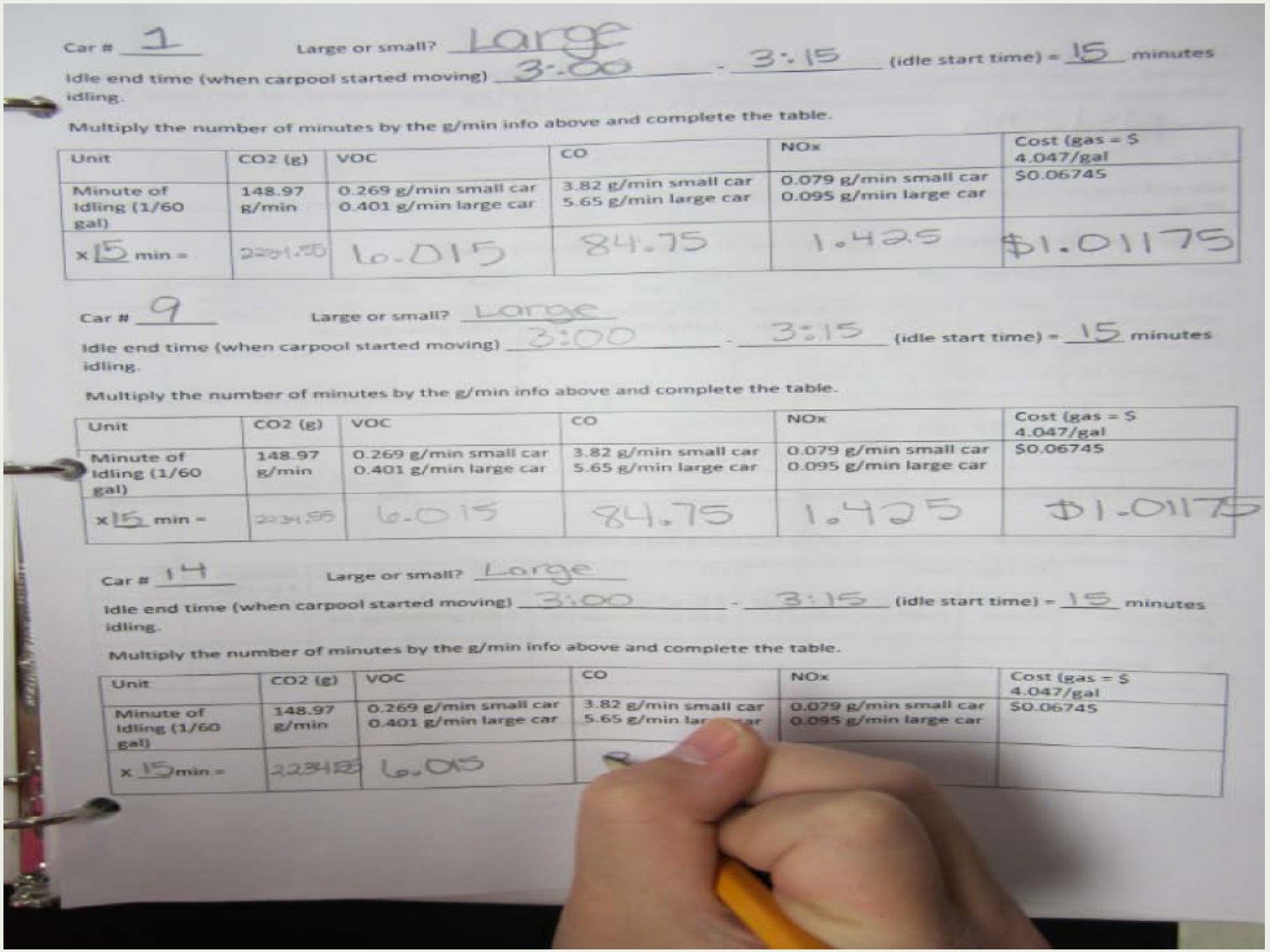
Roadmap to Developing & Reporting Your Climate Stewardship Action Plan

Rubric	Incomplete	---------->	---------->	Complete
	1	2	3	4
Climate Science Issue	Clearly described issue	Need established through evidence	Local context for a local or global issue in climate science	Project is put in the context of others' efforts along the same lines (parallel projects)
Hypothesis	Expected effect described	Hypothesis with expected effect and circumstances stated	Hypothesis includes effect, circumstances, on whom	Hypothesis in if/then form
Data Collection, Analysis and Results	How data was used is described	Rationale for data collected and how it was used	Rationale for data collection, analysis and results	Results given in terms of how the data was collected and analyzed
Stewardship Process and Activities	Activities listed	Process described with activities	Timeline of activities described within the process used	Recommendations made for how to improve the process and activities based on lessons learned
Stewardship Actions	You educate others	You involve others in a short term stewardship project (<2 days)	You involve others in a long term stewardship project (>2 days)	You make stewardship action part of your own ongoing work, and/or the work of an institution. You document measurable results of the actions.
Use of NOAA and NOAA Partner Resources	List given	List with specific resources described	Use of each resource is described	Rationale for why & how the resources were used to support the project
Evaluation	Effects identified	Data collected on effects	Data collected from multiple resources	Results put in context of goals for the project and similar efforts by others
Conclusions	Describes what happened	States conclusions within local context	Evidence-based conclusions	Evidence-based conclusions about the effects with limitations stated
Presentations (please post to wiki)	Project summary written	Presentation after the project	Presentations created for different groups at different times	Rationale for before, during and after presentations to various audiences and stakeholders

Stewardship in Action!

- Restoration with beach grasses
- Polar Bear Challenge: Conserve energy and change habits
- Model UN Climate Change Summit
- Climate Change impacts on wetlands
- Schoolyard garden
- Effects of ocean acidification on Hawaiian ecosystems

Stewardship in Action!



Car # 1 Large or small? Large

Idle end time (when carpool started moving) 3:00 - 3:15 (idle start time) = 15 minutes idling.

Multiply the number of minutes by the g/min info above and complete the table.

Unit	CO2 (g)	VOC	CO	NOx	Cost (gas = $ 4.047/gal
Minute of Idling (1/60 gal)	148.97 g/min	0.269 g/min small car 0.401 g/min large car	3.82 g/min small car 5.65 g/min large car	0.079 g/min small car 0.095 g/min large car	$0.06745
x 15 min =	2231.55	6.015	84.75	1.425	$1.01175

Car # 9 Large or small? Large

Idle end time (when carpool started moving) 3:00 - 3:15 (idle start time) = 15 minutes idling.

Multiply the number of minutes by the g/min info above and complete the table.

Unit	CO2 (g)	VOC	CO	NOx	Cost (gas = $ 4.047/gal
Minute of Idling (1/60 gal)	148.97 g/min	0.269 g/min small car 0.401 g/min large car	3.82 g/min small car 5.65 g/min large car	0.079 g/min small car 0.095 g/min large car	$0.06745
x 15 min =	2231.55	6.015	84.75	1.425	$1.01175

Car # 14 Large or small? Large

Idle end time (when carpool started moving) 3:00 - 3:15 (idle start time) = 15 minutes idling.

Multiply the number of minutes by the g/min info above and complete the table.

Unit	CO2 (g)	VOC	CO	NOx	Cost (gas = $ 4.047/gal
Minute of Idling (1/60 gal)	148.97 g/min	0.269 g/min small car 0.401 g/min large car	3.82 g/min small car 5.65 g/min large car	0.079 g/min small car 0.095 g/min large car	$0.06745
x 15 min =	2234.55	6.015			

Program Evaluation

Research Questions

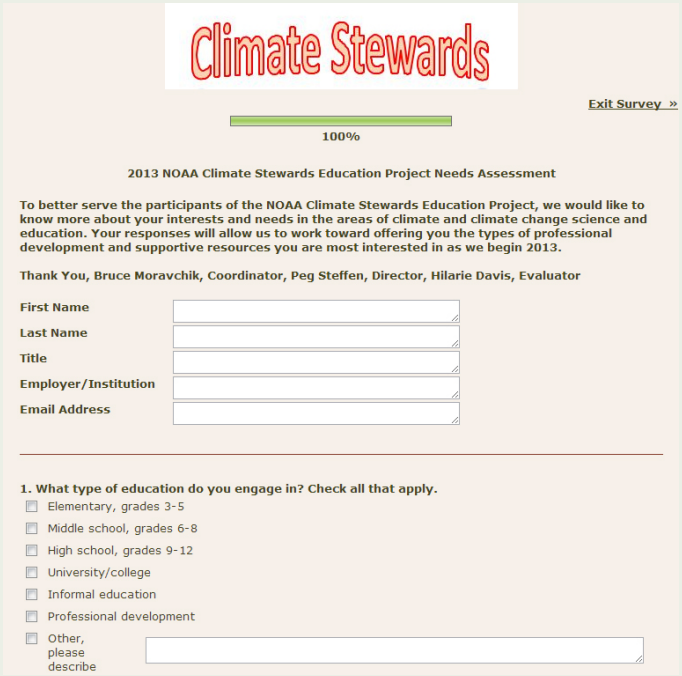
- *What role does increased content knowledge about climate literacy have on participants? To what extent do Climate Stewards increase their content knowledge?*
- *How does implementation of a Stewardship Project affect participants' attitude and behavior toward lessening the potential impacts of climate change?*

Instruments

- Professional Development Reflection and log
- Needs assessment for each new class of educators
- Climate Literacy Understanding Pre and Post test
- Stewardship Project Plan
- Climate Stewardship Plan Rubric to determine stewardship plan completeness and funding
- Reflection Survey – retrospective about effects of project on knowledge, confidence, interest, strategies, resources
- Stewardship project reflection survey – effect of stewardship activities on attitudes and skills

Class of 2013 Needs Assessment

- Why they applied
  - Learn new strategies to introduce students to STEM careers
  - Increase their understanding of NOAA resources
  - Learn about new technology tools such as GIS, virtual platforms, gaming
  - Learn how misconceptions influence student learning



Climate Stewards

Exit Survey »

100%

2013 NOAA Climate Stewards Education Project Needs Assessment

To better serve the participants of the NOAA Climate Stewards Education Project, we would like to know more about your interests and needs in the areas of climate and climate change science and education. Your responses will allow us to work toward offering you the types of professional development and supportive resources you are most interested in as we begin 2013.

Thank You, Bruce Moravchik, Coordinator, Peg Steffen, Director, Hilarie Davis, Evaluator

First Name

Last Name

Title

Employer/Institution

Email Address

1. What type of education do you engage in? Check all that apply.

- Elementary, grades 3-5
- Middle school, grades 6-8
- High school, grades 9-12
- University/college
- Informal education
- Professional development
- Other, please describe

Class of 2013 Needs Assessment

- Topics they are interested in
  - Basic Climate Literacy
  - What people can do about climate change
  - Projections of climate change impacts
  - Human-induced changes to climate
  - Causes of climate change in the present

Other Topics of interest
- Citizen science
- Monitoring programs
- Energy reduction
- Green schools
- Local literacy
- Recycling

Class of 2013 Needs Assessment

- Teaching and Learning Strategies of Interest
  - Emphasizing critical thinking skills
  - Using field experiences for investigations
  - Infusing climate content into existing curriculum
  - Incorporating the use of real-time data
  - Building skills in problem-solving

"I am looking for resources/training for my high school teacher network to get them up-to-speed on the Next Generation Science Standards, in relation to climate science."

Class of 2013 Needs Assessment

- Challenges in Teaching Climate Science
  - Time
  - Resources
  - Equipment
  - Knowledge
  - Alignment with curriculum/standards
  - Community

"Time is key, especially with new common core standards. Resources to implement lessons and the equipment needed are sometimes inadequate or insufficient."

Class of 2011 Evaluation Results

Climate Stewards reported strong effects on stewardship project participants in:

- Feeling they could make a difference (9.1/10)
- Increased knowledge of climate science (8.9)
- Readiness to apply what they had learned to their lives (8.7)
- Increased awareness of climate science careers (8.1)
- Meeting other people interested in climate science (7.5)

Class of 2011 Indicators of Success

- Increased confidence
- Changes in teaching practice
- Use of stewardship projects
- Interest in continuing to participate in the professional development.

"I am much more able to effectively integrate climate into the curriculum due to the resources and training in the program"

Contact

- Peg Steffen peg.steffen@noaa.gov
- Bruce Moravchik bruce.moravchik@noaa.gov

"It is better to teach people in advance about the environment, than to reverse the damage they do..."

6th grade student