

The Need and Opportunity for Incorporating Education and Citizen Science into Fish and Wildlife Management

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K-20 SCIENCE EDUCATION AND CITIZEN SCIENCE: STATUS AND FUTURE DIRECTIONS –

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WDFW Wildlife Outreach Program incorporates the tools and services of the Association of Fish and Wildlife North American Conservation Education Strategy to develop citizen science projects that meet WDFW's science and stewardship needs.

The WDFW Wildlife Program views citizen science strictly through a science lens where:

- Citizen science fills scientific information gaps
- Citizen scientists use approved WDFW scientific protocols, voluntarily reporting valued data that help answer agency questions
- If it is not science, it is not citizen science.

For the past 15 years, WDFW Outreach and Pacific Education Institute (PEI) have engaged state and national partners to lay the groundwork to implement citizen science programs involving students from schools, community colleges and universities, coordinated volunteer groups like the Washington native plant society and Audubon and social media generated interests like "ebirders" and "geocachers."

Game changing accomplishments include:

- Changing the national and state science education standards to include field investigation, and having it tested through state assessments.
- Creating accessible guidelines for field science methodologies used by state fish and wildlife agencies (free downloadable).
- Key partnerships with the University of Washington, Fish and Wildlife Cooperative Research Unit and the *NatureMapping* Program, developing a network of trained volunteers linked to outdoor learning centers, conservation districts and university extension programs to report biodiversity and habitat data.

NEW TOOLS FOR CITIZEN SCIENTISTS – Karen Dvornich

The *NatureMapping* Program was created to gather biodiversity data, primarily wildlife, throughout the State. Its primary goal was to add current data to the Washington Gap Analysis Project's maps and grew to involve citizens K-80 to report wildlife, plant, nearshore, and water data within their communities.

The Program's accomplishments:

- Created a network of Informal Education Organizations to conduct local field research/monitoring projects
<http://www.naturemappingfoundation.org/natmap/about/participants.html>
- Reached out to novices conducting multiple level workshops and developed materials to enhance their knowledge and field skills
 - Web site for education, training, and data collection (1 million hits/month)
www.naturemappingfoundation.org/natmap
 - The book "Awakening Inquiry" – developed for K-8 used by teachers across the US.

- United local communities, their schools and land management agencies to apply their research data for local conservation efforts: Project CAT, Adopt-a-Farmer Project, Literate About Biodiversity, Mule Deer Project, Oak Tree Project, Ohop Creek Monitoring, Crescent Valley Alliance, and others <http://www.naturemappingfoundation.org/natmap/projects/index.html>
- Developed multiple tools using emerging technologies (global high-bandwidth, social networks, digital cameras, GPS mobile phones, and low-cost data storage with cloud computing) to improve the quality of data collected:
 - NatureTracker software for statewide biodiversity data gathering that trains the user while collecting data:
 - Used in “Bioblitzes” around the country by experts and novices
 - Android app for general public
 - Interactive GIS maps
 - eScience Institute’s SQLShare to build a query from disparate databases.

PROTECTING BIODIVERSITY IN WASHINGTON STATE: ANALYSIS, PARALYSIS, AND THE PATH TO EXTINCTION – *Christian Grue*

- Current efforts to protect biodiversity are failing – species “at risk” of extinction are increasing
- We know the land cover types and species in need of protection
- Additional assessments will not provide critical new information (paralysis associated with continued analysis)
- Bottom up vs top down management strategies involving local citizens promoting and participating in the process focused at the county level and taking advantage of the Growth Management Act Open Space requirements: inventory-monitoring-political action
- The public is anxious to help, but needs direction – less connected to the natural world and fear actions will not be of greatest benefit
- We can become “Doers”:
 - Design and implement a biodiversity network within WA counties using a skeleton of public lands and open space
 - Implement through local action
 - Use citizens (K-80) to inventory and monitor
 - Implement at relatively little cost
- What is stopping us? - FEAR
- The realities are:
 - Inadequate State resources even in better economic times
 - Tools available
 - Public anxious to help
 - Credibility of data can be validated
 - Changes in science education complement opportunity
 - General public is going to get involved irrespective of actions
 - Political framework in place - GMA
- Its time to “walk the walk vs talk the talk

WATERVILLE ELEMENTARY SCHOOL ADOPT-A-FARMER VIDEO

- In 1996 to present, 4th grade students have “adopted” 39 farmers who collect data each year across 69,200 acres of dryland wheat farms.

- Waterville Elementary School is the **ONLY** elementary school in the country that has incorporated GIS into their school curriculum.
- “Literate About Biodiversity” across the Waterville Plateau has each grade level collecting data on spiders, butterflies, insects, plants, herps, and mammals.
- 4th grade students presented their work at the 2005 ESRI User’s Conference in the plenary session in front of 14,000 people. They were and have been the only elementary school invited to present.
- They continue to help other schools within their region; present at prestigious conferences such as the Western Governors’ Association, Education Commission of the States National Forum on Education Policy, and the Wildlife Society.

CONCLUDING REMARKS:

- Opportunity for WDFW and the State of Washington to be a leader in the involvement of citizens in natural resource management is NOW
- Opportunity at the State level to enhance natural science education and natural resource management at a time of reduced budgets
- We will fail in protecting the State’s biodiversity without citizen scientists and improved education of the public in natural resource sciences and management
- Education materials have been created, tested, and used; pilot projects successful
- Technology will eventually allow citizens to inform/direct natural resource management with or without the participation/cooperation/collaboration of State resource management agencies
- Lets not let fear of action out weigh the consequences of inaction
- “For all that is said and done; more has been said than done”

NEXT STEPS:

- Establish biodiversity networks within each county in the State and have local citizens inventory and monitor those lands (private and public)
- Solidify the interface between natural science education with an emphasis on K-12 and biodiversity information needs of the State management agencies. WDFW’s Biodiversity Inventory Project is a start, but we can do so much more - need to establish long-term monitoring linking with schools and informal education centers, already in place, with the State agency
- Individual projects are valuable, but we need a statewide initiative that includes monitoring for specific information the agency requires and help the public (and agency) learn by doing. The consequences associated with the alternatives are too great.