Firewise in the Classroom: Technical Notes

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Slide 1: Involving Youth in Spreading the Firewise® Message:

Minnesota and West Virginia Examples

Slide 2: Overview: Firewise in the Classroom

- ✓ **Minnesota Firewise In the Classroom Model**
  Background, Goals-Philosophy, Evolution and Milestones
- ✓ **West Virginia Firewise in the Classroom Model**
  Develop West Virginia GIS System, Modify MN Firewise Curriculum & Implement it in WV
- ✓ **Future Firewise in the Classroom**

Slide 3: Background: Firewise in the Classroom

1. **Origins:**
   - ✓ **In 2001** Stillwater Area High School (District #834) Human Geography study became involved in the Firewise program, utilizing instructional materials created by Dave Schuller of the Minnesota DNR and FPIC GIS software produced by the Minnesota Land Management Information Center. I was the GIS Project Manager at LMIC assisting the DNR Firewise Project.

     In 2001-03, Stillwater students working in cooperation with three fire districts, conducted Firewise Community Assessments encompassing six communities: Afton, Grant, May, Lakeland, Stillwater and West Lakeland Township.

   - ✓ **Curriculum Development:** Based on the success at Stillwater H.S., Minnesota Firewise applied for Firewise grants from the U.S. Forest Service to pay Sara Damon, the Stillwater H.S. geography teacher and a member of the Minnesota Alliance for Geographic Education (MAGE), to create the "Firewise Communities: Reducing the Risk of Wildfire" curriculum.
   - ✓ **Development of a Mobile GIS Lab:** Minnesota Firewise also applied for Firewise grants from the U.S. Forest Service to fund the development of a Mobile GIS Lab.

   - ✓ **Summer Firewise Teacher Training Sessions**: In 2004 DNR hosted the 1st summer workshops to teach educators how to implement Firewise in the Classroom in their school.

2. **PC Based GIS:** The Firewise Grant paid for a Mobile GIS Lab consisting of 34 PCs, LCD projects and wireless printers, for schools to conduct Firewise Projects.

- ✓ Modules from 4 PC to 18 PCs could be shipped to any school in MN. GIS software & data was installed on PCs and 2003 air photos for their community were delivered on DVD.

- ✓ In 2005, I retired from the State of Minnesota and was awarded a contract from MN DNR to provide technical support to the Firewise in the Classroom Project.

- ✓ For the last 7 years, I have provided coordination and 24/7 technical assistance to teachers conducting Firewise School Projects.

3. Move to Web-Based GIS: In 2008, MN DNR, developed Java MAPS (JMAPS) an internet based GIS system. Schools could log into an Internet Server and conduct the Community Assessments using the latest air photos and GIS software. The curriculum was simplified and all data is entered into a statewide data base.

Slide 4: Goals and Philosophy

Goal: Young people, as community members and future homeowners, play a critical role in helping communities to reduce the wildfire risk of homes by conducting Firewise Community Assessments

Philosophy: Firewise Curriculum is a standards-based, authentic learning experience integrating spatial analysis, technology and community service. Students gain content knowledge, apply new skills, are exposed to potential paths, and provide valuable data to their community and state.

Slide 5: Six Simple Lessons

Firewise Curriculum consists of 4 core lessons which lead students through the basic steps of the assessment process and 2 optional lessons for presentation of their findings and exploration of Global Positioning Systems (GPS). A Firewise Project can be completed in 2- 4 class periods.

1. **Science of Wildfire**
2. **What is Firewise**
3. **Making Sense of the Public Land Survey System** (optional lesson)
4. **Using the Internet to Assess Homes at Risk of Wildfire**
5. **Presenting to Local Communities** (optional lesson)
6. **How to Use GPS receivers** (optional lesson)

Slide 6: Level 1 Risk Assessment Process

1 – No Risk: Development with no or few trees.
2 – Low Risk: Home is at least 30 feet from tree canopy edge. (width of a house is about 30')
3 - Moderate Risk: Home is within 30 feet of the tree canopy
4 – High Risk: The outline of the home is obscured on at least one side by the tree canopy.
5 - Extreme Risk: The outline of the home is obscured on the south or west side or on more than one side by the tree canopy.

Slide 7: Homes are Rated On-line

Students participate in a real Firewise Project. They log into a secure DNR web site and enter their Level 1 ratings into a statewide data base. When they have finished rating all homes in a community, DNR reviews and approves all ratings entered by the students.

Slide 8: GIS Analysis of Level 1 Data

Students run a special GIS analysis procedure called: Density Surface Model for their community. A proximity search adds all ratings within 1000 foot of each home and adds the composite score to the center cell. This process is repeated for the entire community. A color may is produced that shows wildfire "High Risk Areas" in their Community. Fire Departments find this map to be an important asset in identifying concentrations of homes at risk from wildfire.

Slide 9: Examination of "High Risk Areas"

For the first 6 years of the project, students evaluated "High Risk Areas" in their community and in partnership with the local fire department, made field trips to these areas to conduct Level 2 Assessments of homes. Over 600 students participated in 17 field trips and rated over 1,100 homes.

Slide 10: Milestones: MN Firewise in the Classroom

1. **Milestones of Firewise in the Classroom:**
   - ✓ In 2004, Sara Damon, Author of the Firewise Curriculum received a national teachers award for developing the curriculum
   - ✓ In 2006, MN Governor's Council on Geographic Information awarded Firewise in the Classroom a Certificate of Recognition
2. **Communities Served by Firewise Projects**
   - ✓ 46 of 87 counties in Minnesota
   - ✓ Students have assessed homes in over 400 communities of Minnesota
   - ✓ Over 310,000 Home Wildfire Risk Assessments completed
   - ✓ Over 1,100 Level 2 Wildfire Hazard Assessments completed
3. **Students and teachers participating in Firewise Projects**
   - ✓ Over 9.000 students were introduced to Firewise Principles
   - ✓ Over 120 School Firewise projects were completed
   - ✓ Over 310,000 Home Wildfire Risk Assessments completed
   - ✓ Students participated in 17 Field trips and completed over 1,100 L2 assessments of homes
   - ✓ 22 Teacher Training sessions were hosted
   - ✓ 110 teachers participated in the training sessions
4. **Technical Support**
   - ✓ GIS 4 Schools provides 24/7 technical support for teachers
   - ✓ DNR provides software support for JMAPS

Slide 11: West Virginia Firewise in the Classroom: Example of how Firewise in the Classroom can be implemented in other states

Phases of 1st Firewise Grant

1: Research and System Development

- Develop West Virginia GIS data layers for use in Firewise in the Classroom Project.
- Develop a Desktop GIS system that could be used by schools in West Virginia.
- Develop a West Virginia Firewise Curriculum that matched WV science standards.

2. Level 1 Risk Assessment Process

- Train WVDOF staff and Hedgesville H.S. teachers.
- Teach students at Hedgesville H.S. how to conduct Level 1 assessments.
- Conduct GIS analysis of Level 1 data to identify "Hot Spots" in The Woods Resort.

3. GeoCode Level 1 & 2 Data to Parcel IDs

- Combine Level 2 Hazard Assessment Data from the two Hazard Assessment reports.
- GeoCode L1 assessment data to Parcel IDs.

4. Level 2 Hazard Assessments

- Spring, 2008 - HHS students conduct L2 Assessment of Section 1 of The Woods.
- Spring, 2009 - HHS students conduct L2 Assessment of Section 2 of The Woods.

Goals of Second Firewise Grant:

1. Continue Firewise in the Classroom Project at HHS to do Level 1 assessments in other communities in West Virginia
2. Complete Level 2 assessments on other sections of The Wood Community.
3. Develop a Web based mitigation and education component.
4. Assist homeowners in The Woods Resort conduct mitigation efforts.

Slide 12: 1 - Research and Develop GIS System

1. GIS 4 Schools built a complete GIS system for use in the Firewise Project. The Desktop GIS system called AtlasGDS. GIS data was down loaded from the WV GIS Clearinghouse and loaded into the Desktop GIS system.

2. Access to Air Photos: A special enhancement to AtlasGDS allowed access to detailed air photos that West Virginia University hosts on their web site. This allows the WV Firewise project to use air photos via the web to assess homes in any community in West Virginia

Slide 13: 2 – Modify Minnesota Firewise Curriculum

The Minnesota Firewise curriculum is nationally recognized as a leader in getting technology into the classroom. The entire Minnesota Firewise curriculum was rewritten and adapted to the unique needs of the West Virginia Firewise Program. It was shortened to only 11 lessons and matched to West Virginia Science Standards. All presentations were redone and all material was added to a new master Teacher Resource DVD. Sun Schroyer, the HHS science teacher and John Anderson, WVDOF Firewise Specialist, attended special Firewise Training sessions in Minnesota to learn how to teach West Virginia Firewise in the Classroom.

Slide 14: 3 - Teaching Firewise in the Classroom:

In September 2007, Ken Pekarek from GIS 4 Schools traveled to Hedgesville in the fall to assist in setting up the Firewise project. With the assistance of the Berkeley County School District network specialists and staff at Hedgesville H.S. software and data were loaded on computers donated by Eagle Promise Charitable Trust for use in the Project. GIS 4 Schools assisted Sun Schroyer teach the first Firewise Project. After providing students simple instructions teachers could step back and let the students go at it. The students dove into the lesson and were very productive with little guidance needed.

Slide 15: Level 1 Risk Assessment Process

Core to the West Virginia Firewise Curriculum was the Level 1 Risk Assessment Process. Students were accessed air photos via the web and rated homes using the 1-5 rating system developed by Minnesota.

Slide 16: Level 1 Wildfire Ratings for The Woods Community

In the first Firewise Project, over 90 students in 4 class periods conducted a Level 1 Assessment of all homes visible from aerial photography. Over two class sessions the students coded over 1400 homes in the Woods and another 300 in Sleepy Hollow. The map on the right shows the Level 1 homes rated in the Woods Community. The map on the left is an enlargement of Section 1 of the Woods. GIS 4 Schools consultant reviewed all the data to verify accuracy. Using a special feature in the GIS program, any of the homes can be clicked on to check on the L1 rating assigned to the house.

Slide 17: GIS Analysis of Level 1 Data

Spatial Analysis programs processed the Level 1 ratings to create a unique map (Density Surface Model) that high lights “High Risk” areas – yellow circles. This allows Firewise Specialists the opportunity to prioritize areas of a development that need Level 2 Hazard Risk Assessments. Five of the seven sections of the Woods were identified as” High Risk Areas”.

Slide 18: 4 – Develop a L2 Hazard Assessment Process and assist in conducting Hazard Assessments at The Woods - GeoCoding Woods Parcel Maps and Level 1 & 2 Data:

Using section parcel maps as a reference, Level 1 data entered by students and Level 2 risk assessments completed by WV Division of Forestry Firewise Specialists were geocoded. Reference tables were created that included the property ID, address, street name and all the values recorded in the Level 1 and Level 2 hazard risk assessment data forms. The yellow parcels on the section 1 map have a Level 2 Hazard Assessment on file. It must be noted that all the Section Parcel Maps and the development plan are not oriented to North pointing up. This is important because all GIS mapping systems have North pointing up.

Slide 19: Level 2 Hazard Assessments of High Risk Areas:

Based on the GIS analysis, field trips were scheduled to sections 1 and 2 as part of the first grant. In the second grant, section 3, Walden Woods and Woods II were assessed. Over **700** Hazard Assessments were completed in the five sections of the Woods. **73%** of the assessments rated homes a High – Extreme Risk. **24%** were rated Moderate Risk and only **3%** received a Low Rating.

Slide 20: 2008 Field Trip to Section 1

Student field trips to conduct Wildfire Hazard Assessments demand careful planning. Terry Mallett coordinated WVDOF foresters, Sun Schroyer from Hedgesville H.S and home owners in The Woods to insure the field trip was successful. The map below is an example of what is needed to make a field trip successful. Student safety is paramount. Students were divided into teams that were monitored by chaperones. Each team had 10 - 14 homes to assess in 1 and a half hours. The bus driver had a time schedule and knew where to drop off and pick up the students. At the end of the assessment period all teams were given a lunch at the community center before returning to school.

Slide 21: Level 1 Hazard Ratings Section 1 – April, 2008:

This is an example of the Hazard Ratings for a Community. Using the Legend Key you can see where there is a concentration of "High Risk" ratings. The GIS mapping system allows the user to click on a house to check on it's hazard rating. Terry Mallet will fill in details on number of homes assessed and the ratings.

Slide 22: Goals of the 2009 Firewise Grant:

The second Firewise allow the opportunity to built on the success of the 1st grant and make enhancements to the West Virginia Firewise Curriculum. I will focus on goals 1 and 3.

1. **Conduct Level 1 Risk Assessments of other West Virginia Communities**
2. **Complete Level 2 Assessments of Other Sections in The Woods**
3. **Develop a Web Based Mitigation and Education Component**
4. **Conduct Mitigation Projects to Reduce the Risk of Wildfire**

Slide 23: Goal 1: Conduct Level 1 assessments of other communities in West Virginia

With two years experience teaching the West Virginia Firewise Curriculum there were several enhancements required so that assessments could be made in other communities.

- Update & simplify West Virginia Firewise Curriculum (6 core lessons)
- Develop a new capability to run GIS mapping software from flash drives
- Develop a sample lesson that assesses homes in other WV communities
- Help Hedgesville educator teach the new lesson (Teacher has a set of flash drives to use)
- Conduct L1 analysis of 4 other WV communities (Sleepy Hollow, The Crossing, Timberline & River Ridge)

Slide 24: Sample Community L1 Wildfire Risk Assessment Process

A new lesson shows how to conduct Level 1 wildfire risk assessments in other communities. For example, WVDOF asked that students assess homes in the Timberline Community in Tucker County.

1. Students teams were assigned sections of the community.
2. Homes visible on the air photo were rated. 270 homes in the Timberline Community.
3. GIS Density Surface Model was run that identified "High Risk Areas"

As of the fall of 2011, students have completed over 2,000 Level 1 Wildfire Risk Assessments in five communities of West Virginia. These include: The Woods, Sleepy Hollow in Berkeley County, The Crossing in Morgan County, River Ridge in Hampshire County and Timberline in Tuck County.

Slide 25: Goal 2 - Level 2 Hazard Assessments of other "High Risk Areas":

Three more field trips were scheduled to section 3, Walden Woods and Woods II. Terry Mallett will covers these in more detail.

Slide 26: Goal 3 – Develop a Web Based Mitigation and Education Component

GIS 4 Schools was charged with the responsibility of researching all relevant Firewise education material and prepared draft versions of The Woods Community Firewise web site that students at Hedgesville H.S. could use to publish the final web site. Terry Mallett will fill in details on the final web site.

Slide 27: Milestones: WV Firewise in the Classroom

1. Communities Served

- ✓ 5 communities were assessed
- ✓ Over 2,000 L1 Risk Assessments
- ✓ 715 L2 Wildfire Hazard Assessments were completed

2. Students involved in Firewise Projects

- ✓ 350 students were introduced to Firewise principles
- ✓ 4 school projects were completed
- ✓ 4 Field trips to The Woods to complete L2 assessments of sections of The Woods
- ✓ 2 custom teacher training sessions were held in Minnesota for Hedgesville H.S. teacher and WVDOF staff

3. Firewise Web Site

- ✓ GIS 4 Schools researched Firewise web sites and educational material relevant to West Virginia's needs
- ✓ Wood Firewise web site *(Terry Mallet will present the results)*

Slide 28: Future of Firewise in the Classroom:

- ✓ **Minnesota Firewise In the Classroom**
  - MN Teachers continue to Teach Firewise
  - County Firewise Specialists are assisting schools in teaching Firewise in the Classroom
- ✓ **West Virginia Firewise in the Classroom**
  - Hedgesville H.S. Teacher will continue to Teach Firewise in the Classroom. The curriculum developed for West Virginia can be taught by other schools in West Virginia.
  - Woods Home Owners Association will continue Home Owner Education and Mitigation
- ✓ **Implement Firewise Education in Other States**
  - MN Firewise Lessons can be downloaded Free at: http://www.dnr.state.mn.us/education/wildfire/firewise_communityproject.html
  - GIS Technical Assistance is needed to implement Level 1 and 2 Risk Assessment Process

Slide 29: Questions?

This is a final report highlighting accomplishments of the Firewise Grant. For more information, please contact:

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