Data Sharing and Management Transcript

Hello, and welcome to the Data Sharing and Management module of the BLM 8100-01 Course, Fundamentals for Managing the Cultural Heritage Program. My name is Kirk Halford. In over 22 years of federal service I have worked for the National Park Service, U.S. Forest Service and the Bureau of Land Management, with 20 of those years as a field archaeologist. In my current capacity I serve as the Deputy Preservation Officer and State Archaeologist in the BLM Idaho State Office. And for the past five years I have served as the National Coordinator for the Cultural Resources Data Sharing Partnership, known by acronym as the CRDSP.

As cultural resource managers a fundamental aspect of our jobs is the management of spatial and tabular data. Spatial data being the site locations and survey locations plotted on a map or in a GIS. The tabular data being the associated site records and reports or tabular databases used to maintain a record of the spatial entities characteristics and information. The use of GPS and GIS technologies and associated databases have made the all-important management of cultural resources data a much more efficient and effective aspect of our jobs, providing us with access to real-time information about the resources we manage. And importantly, it allows for a highly detailed and professional presentation of the data.

Our program and our culture have been going through a fundamental evolution in the past 10-20 years from a paper based to a digitally based records management program. For the past 15 years I have fully embraced this transition using GPS and GIS as a foundation for data management in the field and in the Field Office. As the national CRDSP Coordinator I have worked with the western SHPOs and BLM state offices to advance our use of spatial and database technologies in data sharing and data management.

So I am pleased to have this opportunity to present this training module to you and to help you be a part of this important technological transition from the paper bound to the digital bound world.

In this course we will review two key modules of BLM's cultural resources data management and sharing program. In module one, we will discuss our program's movement into the digital age and the application of digital technologies in the field and in the office. In module two we will discuss the Cultural Resources Data Sharing Partnership, the CRDSP. Now in its fourteenth year, the BLM initiated the CRDSP in 1997 to meet commitments under the BLM national Programmatic Agreement. The key objectives are to show you the technological resources that are readily available for your job that will allow you to realize significant workflow efficiencies and to provide you with background and information about the Cultural Heritage program's efforts to move fully into the digital age so you may take advantage of the resources available.

In Module 1 we will discuss;

- The Transition from Paper to Digital,
- The Field use of GPS technology,
- GPS Standards,
- Mapping sites and inventories using GPS and GIS,

- Moving From field to GIS, and
- Analytical applications

In 2001, the BLM through the CRDSP, known at that time as the Data Users Group, conducted a survey to quantify use and application by Field Office specialists of GPS and GIS technologies. Respondents indicated that;

- 55% used GPS
- 73% had access to GPS equipment

In 2008, the CRDSP conducted a follow-up survey, known as the State of the States Survey, which showed a significant increase in use and availability between the 2001 and 2008 surveys.

- With 92% of the respondents in 2008 using GPS, and
- 100% having access to GPS equipment

As this slide shows Trimble and Garmin have been the favored GPS hardware types employed by the agency, with Trimble being the preferred unit due to its ability to run software applications such as TerraSync and ArcPad.

Also, Trimble's post-processing functionality and the sub-meter accuracy of the data once post processed is important.

<u>Transition from Paper to Digital 2001 Survey - GIS</u>

Looking at GIS capabilities, the 2001 survey showed that;

- 77% of the respondents had ArcView on their Desktop,
- and 67% had ArcView Training.
- and as far as GIS proficiency - 30% did not use; 30% novice; 40% were regular or advanced users.
- The Frequency of GIS showed an even split with - 33% never using, 33% some, and 33% frequently.

The 2008 Survey indicated that an average of 97% of Field Office Archaeologists had ArcGIS/ArcMap on their desktops and use increased to roughly 95%.

We want to increase use to 100%, with proficient users making use of digital technologies as part of the daily workflow routine.

As the use of digital technologies and applications has grown the need for standards has become more and more critical.

Recognizing this, in the 2004 update of the 8100 Manual series, standards for use of GPS were included as Appendix 2 of the 8110 Manual. The key objectives are to:

- Provide Minimum requirements for recording locations using GPS technology,
- to Improve the overall reliability of site location information,
- to Support the standardization and expansion of GIS applications,
- to Provide an Accuracy Standard, with a Mean Error of +/-12.5 meters or less,
- to provide standards for Field Observations, such as recording the Centroid of a Site, and
- a Standardized Coordinate System and Projection: the Universal Transverse Mercator (UTM) coordinate system, projected in NAD83, which has become the BLM's standard projection.

While a compass still has some utility and should be maintained in your toolkit for purposes of surveying transects and as a backup should satellites not be available or a GPS low battery, you should use a global positioning system for accurate recordation of your site boundaries, artifacts and features.

With GPS the accuracy level can be sub meter after differential correction.
The advantages of GPS versus the good old map and compass is:

- That it is a Satellite based radio trilateration system which provides high accuracy data, triangulating from a minimum of 4 satellites, out of a universe of over 30 satellites,
- it provides Worldwide coverage, in All Weather and 24/7 coverage.
- By utilizing a minimum of 4 satellites, a 3 dimensional positioning is obtained which is accurate from centimeter to 10s of meters on a second by second basis.

With differential correction the intra site artifacts and features can be accurately plotted and mapped as shown here. And the site boundaries can be accurately mapped and plotted in your GIS. In this case the GPS was used to not only to map the site boundaries and the site's artifacts and features, but also locations where ARPA violations occurred.

As is shown here the GPS was employed to collect accurate, sub-meter data at a site where an ARPA violation occurred, helping build a strong case for prosecution. Note the drill holes to the left of the recorder.

Ultimately the field-derived GPS data is downloaded to your GIS and can be utilized in a number of analytical and mapping formats, from creation of the site map, the report map, determining site dimensions and the UTM coordinates of the site center or centroid, as it formally known in GPS and GIS speak. And importantly you now have a digital record of your resource which can easily and accurately be reproduced and utilized in various analytical and modeling efforts.

Most importantly you are creating a digital repository for your cultural resources data and information, that is easily accessible, provides real time access, and products that can be used with other resource information and layers for NEPA and NHPA analyses and modeling. In this instance the known and previously recorded site and survey data is being analyzed for a grazing lease permit renewal along with spring and trough locations where livestock are known to congregate and may affect resources.

In the application shown here, site data is plotted against a hillshade model and OHV routes of travel. Routes were sampled to test previously defined cultural resource sensitivity zones that were created in a GIS by using existing site location data and geographic and hydrologic features. The model proved to be highly accurate in predicting site locations, thus allowing for targeted inventory for future proposed projects.

The Cultural Resources Data Sharing Partnership (CRDSP)

In this section we will discuss the Cultural Resources Data Sharing Partnership, the CRDSP, which I had the privilege to coordinate for the Washington Office from 2006 through 2011.

The CRDSP is a partnership between BLM and the western SHPOs in 11 states. The members include BLM state data representatives and SHPO data managers from each state, as well as the BLM Preservation Officer, State Deputy Preservation Officers and the CRDSP coordinator.

In this module the topics we will focus on include:

- the History of the CRDSP,
- the Authorities under which it is implemented,
- the Purpose, Vision, Mission and The BLM Business Model of the CRDSP,
- State Data Sharing Goals,
- Data Standards for Metadata and Content Standards for GIS datasets,
- Confidentiality,
- The State Data Representative,
- and the CRDSP Budget and Funding.

Now in its fourteenth year, the BLM initiated the Cultural Resources Data Sharing Partnership (CRDSP) in 1997 to meet commitments under the 1997 BLM national Programmatic Agreement (nPA). A key goal of the nPA with the Advisory Council on Historic Preservation (ACHP) and National Conference of State Historic Preservation Officers (NCSHPO) is to streamline and simplify procedural requirements.

The nPA required each State-specific protocol, developed under the nPA, to address "data sharing, including information management and support." As mentioned previously, the BLM works in partnership with the State Historic Preservation Offices (SHPOs) in 11 western states, including Alaska, Oregon, California, Nevada, Arizona, New Mexico, Colorado, Utah, Idaho, Wyoming, and Montana.

The BLM funds a national coordinator to facilitate and manage the partnership as well as data representatives in each state and provides funding to assist the SHPOs with data management. The CRDSP has become an important part of the overall relationship between BLM and the SHPOs in the states where BLM has significant presence and activities.

The rationale for the CRDSP is the SHPO responsibility under Section 101 (b)(3)(A) of the National Historic Preservation Act to cooperate with Federal agencies, in addition to other entities, to survey and maintain comprehensive statewide inventories of historic properties.

The CRDSP also facilitates implementation of the provisions of BLM Manual 8110, "Identifying and Evaluating Cultural Resources", and more specifically Section 8110.5, "Documentation and Maintenance of Data, Records and Maps."

Investing in a SHPO-hosted shared inventory, as opposed to an agency-specific system, avoids duplication of effort and can result in significant cost savings. BLM continually requires up to date and accurate cultural resources data for undertakings that makes maintaining a shared statewide inventory critical for BLM as well as other state and federal agencies.
The CRDSP business model to support a statewide inventory of cultural resources data provides for cost effective data management. BLM's sustained, national-level, commitment to this project makes BLM a leader among Federal agency cultural resources programs.

In 2007 the CRDSP created vision and mission statements:

The vision of the CRDSP is that; "Cultural resources professionals will have consistent, easy to use, reliable spatial information systems on their desktops with access to cultural spatial data servers that assist them in doing their jobs as managers, researchers, and cultural resource professionals."

The CRDSP Mission Statement states that; The CRDSP, through its members, will serve as a coordinating and facilitative group:

- To ensure that field users have appropriate tools to do their jobs,
- Information systems are created in a consistent fashion,
- Technology investments are sharable (and shared),
- Training and support is provided to information system users,
- The use of information systems is promoted at the field level,
- The development of information systems is pursued,
- Information users have appropriate shared information to do their job, and
- Statistics and metrics are compiled consistently to measure progress

The vision and mission statements have provided the foundation for the CRDSP's focus and goals. And follows closely the goals outlined in the Preserve America Summit of 2006, which included the Priority Action Area and the ACHP's Recommendation:

• To develop and maintain a reliable comprehensive national inventory of historic properties that contains information necessary for management, planning, and decision making and that is accessible to users, and

• To develop a comprehensive inventory of our nation's historic legacy by 2016.

A fundamental goal of the CRDSP is to move us all away from paper to digital management, which realizes many significant benefits and efficiencies, from data storage, to management, to access, to use and analysis.

The cost benefit of the CRDSP has been and can be realized in many ways, including:

• Leveraging Partners: Each state has various partners along with BLM such as the Department of Transportation, Department of Energy, Bureau of Reclamation, Natural Resources Conservation Service and others.

• We are working towards the Digital Data Management of Records. Currently, all States are converting, or have converted, paper records of investigations and resources into electronic formats.

• Also, we are moving towards full Digital Management of Spatial Data: SHPOs and BLM have digitized spatial data into Geographic Information Systems (GIS), and finally,

• Relational Databases have been created where cultural resource attribute data is stored in tabular form that can be linked with a GIS.

All of this leads to real time access to cultural resources information and data, and creates significant time and cost savings in our day to day workflow.

You may recall our earlier discussion of CRDSP surveys which showed in 2001 that roughly 50% of BLM field staff had access and used GPS and GIS technologies, while in 2008 the average reached over 95%. In parallel with the BLM/CRDSP effort SHPOs across the country have been actively moving their paper world to a digital environment. The 2008 NCSHPO national survey shows that all across the country SHPOs have undertaken efforts to move to a digital inventory. And as a result of BLM/CRDSP efforts our western partners are far above the national average with many states reaching towards the 100% mark.

And as shown here the majority of site data has been entered by SHPOs across the country. These percentages no doubt are on the rise each year. So as we can see there is a national commitment in the cultural resources management community to become fully digital. No doubt this has been a monumental and time consuming effort as the back log of paper records collected over the past 50 to 100 years is significant and the quality control of the data requires meticulous attention and patience, and there is much work still to be done to reach our goals.

To ensure the CRDSP stays on target each state in 2009 created 2 and 5 year goals to meet the CRDSP's vision and mission. Shared 2 Year goals include:

1. Insuring funding viability by leveraging the CRDSP as a cost sharing endeavor. SHPOs have assessed the funding provided by BLM as a percentage of their total data management cost. Currently SHPOs provide a 3:1 or better match on BLM funds expended, which emphasizes the public benefit and cost savings of the partnership.

2. Training is recognized as a fundamental need and each state is working on basic training curriculum for their data-sharing (electronic) systems.

3. States continue to assess time and cost savings achieved by shared digital data compared to earlier, paper-based systems. Analyses have shown that significant time and cost savings are realized by maintaining accessible digital data, as in the example shown here.

The example is from a 2008 analysis of the Bishop Field Office's Section 106 compliance for Grazing Lease Renewals.

To conduct background research and affects analyses for the Bodie Hills EA, which included 7 allotments, totaling 168,121 acres, it was calculated that;

- The cost per allotment using paper records would be $475.00,
- while using digital data the cost was $48 per allotment.
- Digital data results in one day versus five days for conducting background or Class I research. Imagine having to spread 25 7.5' quads across the floor and plot range improvements by hand to conduct your analysis. And pulling site records and reports off the shelf versus having them in digital format and tabular databases linked to your GIS spatial data.
- It was projected that using paper records to analyze 698 allotments statewide would cost the state $332,000, while using digital data would cost $33,500.

A Savings of $298,496 (or a 90% Difference)

The 2009, 5 Year Goals of the CRDSP include:

1. The Full Population of Data Systems with legacy data, in other words eliminating the backlog.

2. Each state will have a means to submit basic information categories, such as site and survey location, resource and inventory records electronically. The means may be on-line, PDA-based, satellite applications, etc., but will convey data electronically.

3. All state protocols will include data-sharing terms.

The creation of standards for data management and sharing has been a key task of the CRDSP. Standards for the content and format of data sets enhance efficiency in many ways. Standards increase the value of data by defining content, so data users know how best to employ information. Standards increase the exchange and needless duplication of information collection, by creating reliable formats for transmitting data. Standards define target formats for new software, hardware, and work processes, saving effort as an enterprise evolves. In 2007 the CRDSP adopted a set of standards to enhance consistency for data management and sharing across the states.

Common fields include information such as
1) Data creator,
2) Date created,
3) Resource identifiers,
4) Coordinate system, and
5) Horizontal Positional Accuracy, etc.

Data can be standardized in data entry forms as in this example of a GIS data content entry form. Standard fields include;

State, County, site trinomial, agency identifier or number, horizontal position accuracy, source or how was it created (using a GPS, 1:24k quad, etc.), recorder, date and projection.

And site attribute or content data includes standard fields such as; resource name, resource attributes (such as pottery, features, projectile points), date, age (such as prehistoric or historic), if collections were made and National Register eligibility status.

Confidentiality

Confidentiality of the records and the foundation of security goals are found in our regulatory authorities and responsibilities, such as the Archaeological Resources Protection Act (ARPA) and the National Historic Preservation Act (NHPA).

Under ARPA, and the implementing regulations found at 43 CFR Part 7.18(a), "the Federal land manager shall not make available to the public information concerning the nature and location of any archaeological resource…"

Under Section 304 of the NHPA there are provisions for Freedom of Information Act exemptions. As cited we have the

(a) Authority to withhold from disclosure.

The head of a Federal agency or other public official receiving grant assistance pursuant to this Act, after consultation with the Secretary, shall withhold from disclosure to the public, information about the location, character, or ownership of a historic resource if the Secretary and the agency determine that disclosure may -

(1) cause a significant invasion of privacy;

(2) risk harm to the historic resource; or

(3) impede the use of a traditional religious site by practitioners.

Each state SHPO has guidelines for data access and security. On the bottom of the slide you can find the link to the Data Sharing Partnership web site which contains information from the states and their provisions for ensuring confidentiality.

http://www.blm.gov/wo/st/en/prog/more/CRM/CRDSP/permiting_standards.html

As mentioned each state has a Data Representative that represents your state on the CRDSP and works on your state specific data management and sharing needs.

- Your role and responsibility as the Field Office specialist is to get to know and work with Your State Data Representative.
- Participate in Your States' Data Management and Data Sharing Systems.
- Identify and take Needed Training for GIS and GPS Proficiency and.

- Get on Board the Techno-Ship.

For more information on the CRDSP and a list of BLM and SHPO data representatives go to the National Heritage Resources web site. Click on the Data Sharing Partnership site on the right hand side of your Screen.

Budget

And finally, the topic that always seems to be of interest to us all, the budget and how is CRDSP funded.

Since its inception the CRDSP has been a centrally funded initiative, funded by benefitting subactivities including, Range, Cultural Resources, Recreation Resources, Oil and Gas, Lands and Realty, Planning, Mining Law Administration, and Wildland Fire Management.

Over the past 14 years the CRDSP has received a total of $4,732,000 in funding distributed among the states. While in recent years funding has increased due to continued support and exposure of the partnership, the average funding level has been $338,000 per year, distributed among the 11 western states.

Increases in the past 5 years have been realized to fund the time and travel of the national coordinator and state data representatives. The balance of the funding is used by each state to fund assistance agreements and other initiatives in the state in support of the CRDSP's mission and goals.

Beginning in FY 12, the CRDSP will be fully funded by the Cultural Heritage program, 1050, as the CRDSP is seen as a cornerstone of the program.

Closing

In this course we have reviewed the Cultural Heritage Program's Data Management and Data Sharing initiative with a focus on our transition to the digital age.

A central part of the transition has been facilitated by the Cultural Resources Data Sharing Partnership. The techno-bus, as I like to call it, has left the station and we all need to be onboard to enhance the efficiencies and professionalism of our program.

As has been illustrated the workflow efficiencies, time and cost savings are significant when we have full access to our data in a digital format and we employ the technologies such as GPS and GIS to record and manage our data.

Thank you for your time and attention. If you have any questions I encourage you to contact your data representative and state program lead and become engaged in your states data management initiatives.