Washington County's Strategic Plan to Reach ORMAP Goal 4

Introduction

This document outlines the Washington County strategic plan to reach ORMAP Goal 4 mapping standards. Much of the information provided is based on over a decade of GIS involvement. Our current GIS organization was modeled after our 1991 GIS Implementation plan. Several elements have led to the great success of our GIS, notably the frequent interaction among system users and the commitment from management to support our system.

Changes to this document will be limited to updating current mapping statistics and future adjustments that may be needed to meet ORMAP Goal 4. This document will be used as support documentation for ORMAP fund requests.

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Background

Washington County has been involved in a parcel level GIS for almost 15 years. Long before ORMAP, long before digital assessor map standards, Washington County was in pursuit of the same goals that we now refer to as ORMAP goals. The following discussion outlines decisions we have made and where we are and how we plan to reach ORMAP Goal 4 in fiscal year 2008/2009

In 1987 the Board of County Commissioners adopted a Long Range Information System Strategic Plan. As part of the Strategic Plan staff was directed to study GIS and to return to the Board with a recommendation on how to proceed with development of a GIS for Washington County. In August 1987, an interdepartmental GIS Steering Committee was formed. In May 1989, the GIS Steering Committee presented its findings and recommendations to the Board of County Commissioners. The committee concluded that "a sound business case can be made for implementing GIS in Washington County. Cost savings, improved quality of mapping and information management and analysis, and increased efficiencies of County operations are anticipated with GIS implementation."

In January 1991, the county published the GIS Implementation Plan. The implementation approach for developing our GIS was predicated upon a strategy that provides a cost effective and timely solution for enabling the County to begin mapping and information analysis within a GIS environment. It was determined that a phased implementation approach would be followed.

> Phase I of our GIS implementation plan is primarily devoted to developing the three basic GIS components common to the majority of GIS applications. These components include the geodetic/survey control, the parcel base map and the street base map. The parcel base map and street base map portions of Phase I were completed in 1991. The geodetic control portion of Phase I is still in progress along with the adjustment of the parcel and street base map to the geodetic control.
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> Phase 2 of our GIS implementation plan is the development of applications that are able to take advantage of the newly created base maps and building upon them. These applications were designed around particular departments needs and were originally developed for in-house use. For example, A&T developed sales, soils, tax code and tax map applications, Land Use & Transportation developed planning, zoning and notification applications, Survey developed corner, geodetic control, and survey applications. Phase 2 of our GIS is mature in its development efforts. Talented and experienced GIS specialists develop new applications on an as needed basis.
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> Phase 3 of our GIS implementation plan was defined in very general terms in 1991. I think now it would be defined as the development of applications that provide data to the public. That would include Internet applications, such as our InterMap and SurveyNet products, an FTP site to handle the downloads of our tremendous volume of data, dial up services for title companies, emergency management data, etc…. Phase 3 is currently in progress.

Project management and project staffing in Washington County are two key factors that have contributed to the success of the County's GIS project.

Project management has been key to assuring the coordination of the GIS among various County departments, jurisdictions, and other public/private users or contributors. The ORMAP policy consideration of promoting partnerships has been a requisite part of our GIS implementation plan from the beginning. A distributed GIS function within the County would never succeed without exceptional coordination and communication of all parties involved. Examples of this effort are regular GIS users meetings, Countywide users meetings and email notifications. The distributed model has allowed A&T to maintain ownership of the cadastral layer thus insuring the quality of the product.

Project Staffing has played a critical role in the success of the County's GIS project. As outlined in the original implementation plan, GIS staffing has been largely met through existing staff. Despite the tremendous growth that Washington County has experienced over the last decade, the number of cartographers on staff has not been increased. Because of the increased workload it became necessary to seek additional help. This help came in the form of a COGO contract and an intern. The need for extensive GIS training for A&T Cartographers has been accomplished – our cartographers are as comfortable with pen and ink as they are with computers and GIS.

Since 1991 we have been fortunate enough to have a working parcel layer affectionately called the 'cartoon'. While suitable for many planning purposes, the 'cartoon' was never accurate enough for assessors' maps. We have been maintaining two sets of maps, the 'cartoon' GIS product and mylar assessors maps since 1991. In 1995 we produced our first digital assessors map. In 2000 we moved eight sections to final control and only maintain one data set for these areas. As noted in the 1991 Washington County GIS Implementation Plan:

> *"It is important to note that there is a long term need for improving upon the accuracy of the a GIS system. GIS applications will initially rely upon existing geodetic control and parcel base which are generally accurate to an estimated plus or minus ten feet within the urban area. While this level of accuracy is adequate for the majority of county applications, there is a desire to improve accuracy to plus or minus one foot.* ***This level of accuracy is required for engineering applications and is the long term objective for the Department of Assessment & Taxation's parcel maps"***

We have a working partnership with the Survey Division to develop a geodetic control network to insure that our assessor's map and GIS meet appropriate accuracy standards. We have developed a list of the areas that have priority for geodetic control, as well as establishing time frames for completion of geodetic control by area.

Our ability to keep up with current work load and at the same time continue to create more digital assessors maps has been aided by a commitment of our Information Technology Services department to support the County GIS system. As originally envisioned in 1991, the GIS system was a UNIX operating system attached to X-Terminals. This system was in place in 1992 and went largely unchanged until 1996 when the X-Terminals were replaced with PC's. During this period suites of software routines were developed that greatly increased map production, standardized map elements and reduced redundant operations. Clearly the benefit of having a dedicated departmental GIS Specialist has been the ability to react to changes and implement innovative solutions to increase productivity and improve the product.

As early as 1994, Washington County was looking for ways to reduce administrative duties while at the same time increasing public service and access. One method we assessed was the use of scanned tax maps in lieu of paper copies. In a unique partnership with a local surveying/imaging company, Washington County was producing scanned tax maps by 1995. Since then we have streamlined the process to the point that the images available via our Internet site are available before the paper maps they represent. Washington County has taken over the process of producing, updating, and maintaining scanned tax maps. We produce a fraction of the paper maps we used to before scanned tax maps were available. Monthly tax map CD's are sent to subscribers for close to $500.00 less then the cost of filmed tax maps. An additional benefit is that we have almost seven years of historical data. This commitment to innovative technology, public service and cost savings is an excellent example of public stewardship and demonstrates one of the original goals as envisioned in 1987.

The current state of Washington County's GIS system is difficult to assess since innovative solutions to increase productivity and improve workflow are constantly changing. The present tool set available to the general public includes assessor maps, assessor data, surveys, plats, road notes, and a range of different overlays from flood plains to aerial photography. The most visited pages on the Washington County Internet site are the Maps & Land Record pages. We don't expect that to change, indeed we expect to see the numbers increase as more scanned data is made available, ORMAP goal 4 maps are produced, and new capabilities are incorporated into our public service sphere of influence.

By utilizing additional help, partnering with other entities, using state-of-the art map creation tools, and pursuing effective change, Washington County is prepared to meet the ORMAP Goal 4 by 2008.

Obtain extra help as needed

Use of an intern:

Washington County contracted with Inside Oregon Enterprises to COGO partition and subdivision plats. This contract was signed in 1995 but actual production didn't begin until 1997. In early 2001, the contract was completed with over 3800 accurately COGO'ed partition, condominium and subdivision ArcInfo coverages.

Washington County has over 3200 COGO'ed partition and subdivision plats that have yet to be placed into Goal 4 (G4) Assessors maps. While our regular cartography staff continues to create and maintain G4 Maps, there is not enough time or manpower to go back to developed areas and create G4 maps. The use of an intern to compile the data will greatly increase development of new G4 maps. Data compiled by the intern will be used to immediately replace mylar maps or set aside until cartography staff can fill in the missing pieces. This task could not be accomplished outside the confines of Washington County A&T without access to source documents contained at present within the county archives.

Outsource if necessary:

Washington County currently has a professional services maintenance contract with Inside Oregon Industries to COGO partitions, subdivisions and condominiums. If workload and circumstances warrant, we would divert some of our workload to Inside Oregon Enterprises.

Use of overtime:

In 1994 Washington County began it's digital mapping evolution. In 1995 our first digital assessors maps were created. In 1996 we realized the need to get to an all digital GIS taxlot base. In an effort to expedite the process, we created an overtime account with dedicated funds for digital map production only. Budget constraints and increased personnel costs has reduced the amount of time/money spent on digital map creation. In order to keep up with our regular workload and at the same time perform digital remapping, we devised a plan to allocate overtime hours for ONLY this purpose using a separate accounting code. The dollar amount for our overtime project has been relatively static since it's inception but the cost per hour has increased due to promotions, pay raises and job reclassifications. In all years past when we have been fully staffed, the entire dollar amount was used.

Summary:

- Hire an intern
- Outsource if necessary
- Use overtime

Reach out to other departments and jurisdictions to densify our geodetic control network

Work with the Washington County Surveyor's office to densify re-monumented corners:

Most of Washington County lacks the geodetic control density necessary to minimally constrain our tax parcels. Unfortunately, the majority of these maps are floating in space; That is to say that we lack adequate geodetic control to accurately move maps to the State Plane Coordinate System (or any coordinate system for that matter). Several of the areas within the Urban Growth Boundary (UGB) and the majority of areas outside the UGB have a significant lack of geodetic control. The maps constructed in these transition areas cannot be moved to their final geodetically constrained positions without denser geodetic control. The minimum number of control points required to geodetically constrain a mapping area within the UGB is four points per square mile. Each control point should have a relative accuracy of 3 centimeters or less. We will focus on improving the control network in the UGB for areas that are experiencing rapid growth and the county boundary. Focus will be on the establishment of geodetic control only on those monuments or corners that have been set and accepted by the County Surveyor. These monuments include Donation Land Claim Corners (DLC), Public Land Survey System (PLSS) corners, and geodetic control established by Federal agencies.

Coordinate efforts with adjacent counties to establish the county boundary:

One of the most important and difficult tasks of the entire ORMAP project is the edgematching of data from every county. The only way to effectively solve this problem is to accurately establish the county boundaries with re-monumented corners and geodetic coordinates, and then agree to their use. The cooperative collaboration of adjacent counties will insure that common points are identified and defined for use by all parties.

Partner with local jurisdictions to densify geodetic control:

Using an RFP developed by the Washington County Surveyor, local jurisdictions have a vehicle in which to obtain geodetic control that meets the Washington County A&T Standards. This RFP also provides Washington County A&T a means of using ORMAP funds to target certain areas of the county that need densification or helping to expand the area that a local jurisdiction may not have the funds for. The City of Tigard has completed their geodetic control project and the City of Hillsboro is currently in the process.

Summary:

- Work with the Washington County Surveyor's office to densify re-monumented corners
- Coordinate efforts with adjacent counties to establish the county boundary
- Partner with local jurisdictions to densify geodetic control

Maintain and update map creation tools

Purchase software updates when prudent and necessary:

Washington County Cartography has maintained a software policy to replace or upgrade when required by vendor or to improve productivity. This doesn't mean we won't change if and when a change is necessary, but it does mean we won't be chasing software revisions without a very compelling reason. Case in point: Our current software revision is almost 4 years old, but the newest revision doesn't have the same tool set our current version has. When it does, then and only then, will we begin to consider an upgrade, which will surely require a hardware upgrade as well. Several innovative improvements to the tax maps have been implemented by Washington County. These include the visual locator index, the use of shading and color on the paper maps, the use of paper over mylar, the creation and delivery of tax map images to the desktop, and the delivery of tax maps on CD as images in lieu of filmed or paper maps. Our maps have been featured twice in the prestigious ESRI map book and was used as an example in a college textbook. The future is bright for other ways to increase productivity, improve workflow and eliminate redundant processes

Purchase hardware updates when prudent and necessary:

Washington County cartography staff is fortunate to have been provided with powerful computer workstations over the years. The first iteration in the early 90's were Hewlett-Packard X-Terminals with 19" monitors. These were eventually replaced with 200 mhz pc's running x-terminal emulation and 17" monitors. It soon became apparent that these monitor sizes were inadequate for our uses. The 17" monitors were replaced with 21" monitors and high-performance video cards. As more data became available on-line (maps, surveys, road notes, etc..), performance and work output suffered. It was determined that faster PC's and video capabilities were needed. The next generation of PC's were 466 mhz and dual 21" monitor machines. Even with these machines, as network traffic increased, performance was worse then with the 200mhz machines. As a result, the cartography group was placed on it's own network and the PC's were upgraded to 900mhz and that is where we stand today. We expect to continue our upgrades as necessary and insure those employees involved in the digital map creation process have the same level of computing power.

Summary:

- Purchase software updates when prudent and necessary
- Purchase hardware updates when prudent and necessary

Analyze and evaluate the map making process

During the transition of mylar to digital mapping it became apparent that some method of accurately tracking progress was needed. These tracking tools are now in place. Software programs have been developed that tracks who, when and what map was created, the number of total maps, the number of taxlots, the percentage of taxlots that are digital, etc. These tools will be used to analyze trends and forecast the number of maps needed to reach ORMAP Goal 4 by fiscal year 2008/2009. The following example illustrates our status through the first two quarters of 2001/2002

Totals	Maps w/Accnts	Number of Accnts	Increase	TOTAL MAPS	Supp/Index Maps	Digital Maps	Percent Maps	Digital Accnts	Percent Accnts
January 6, 1999	2215	137477	1099			336		29111	21%
April 1, 1999	2224	138628	1151	2418		370	15.30%		
October 1, 1999	2242	140307	1679	2447		437	17.86%	32363	23%
January 1, 2000	2255	140991	2363	2468	213	521	21.11%	37263	26%
May 3, 2000	2271	142826	1835	2493	222	597	23.95%	42352	30%
July 12, 2000	2276	143598	772	2505	229	621	24.79%	43624	30%
October 1, 2000	2284	145225	1627	2523	239	647	25.64%	45036	31%
January 10, 2001	2287	146005	780	2532	245	685	27.05%	48492	33%
April 2, 2001	2292	147062	1057	2547	255	727	28.54%	51706	35%
July 11, 2001	2295	147696	634	2553	258	754	29.53%	53446	36%
October 19, 2001	2312	148318	622	2570	258	784	30.51%	54661	37%
January 2, 2002	2316	149293	975	2578	262	815	31.61%	57976	39%
December 31, 2002	2332	152089	657	2600	268	933	35.88%	67273	44%
Januray 5, 2004	2349	155214	786	2621	272	1113	42.46%	78298	50%

Summary:
Use statistical analysis tools to monitor map production
Evaluate and analyze historical information
Predict what milestones will have to be reached to meet the Goal 4 deadline
Recommend changes necessary to reach Goal 4 based on analysis

Pursue ways to implement innovative solutions to increase productivity

Utilize technology to automate or improve workflow

Through the cooperative efforts of the Appraisal division, Information Services and the GIS Specialists in other departments, a plan was developed to provide data, programming and GIS components to the rest of the county. Two of these ground-breaking developments are InterMap and SurveyNet. Using data created and maintained by a combination of different departments, spatial queries ranging from survey plats to assessor data to tax maps to building permits are available at the click of a mouse. These GIS components have been so successful that they are the most visited pages on the county website. SurveyNet's success was featured in a major surveying publication. Their success is a tribute to the innovative spirit of the GIS staff in Washington County. We will continue to look for other ways to automate and improve map production.

Leverage the use of scanned documents

Washington County has been scanning various types of documents for many years. These include surveys, assessors maps, road notes, and other property related records. However, it wasn't until April 2001 that Washington County moved from filming recorded documents to scanning recorded documents. Although we had the infrastructure available to effectively serve up the huge volume of scanned images we had stored, it wasn't until November 2001 that the Recorder's office went live with a scanned image solution to document storage and retrieval. With the tools in place to store, view, print and query scanned data, the push is on to obtain as many scanned documents as possible. The benefits to cartography are already being realized with the limited number of documents we now have on-line. The combination of scanned deeds, surveys, road notes, plats and maps with computer hardware designed to take advantage of these new technologies has greatly reduced the time we spend in research, the paper costs, the maintenance required for printers and new microfilm reader/printer equipment. Additional scanned documents will continue to increase productivity.

Aerial photo/Digital Elevation Model Improvement

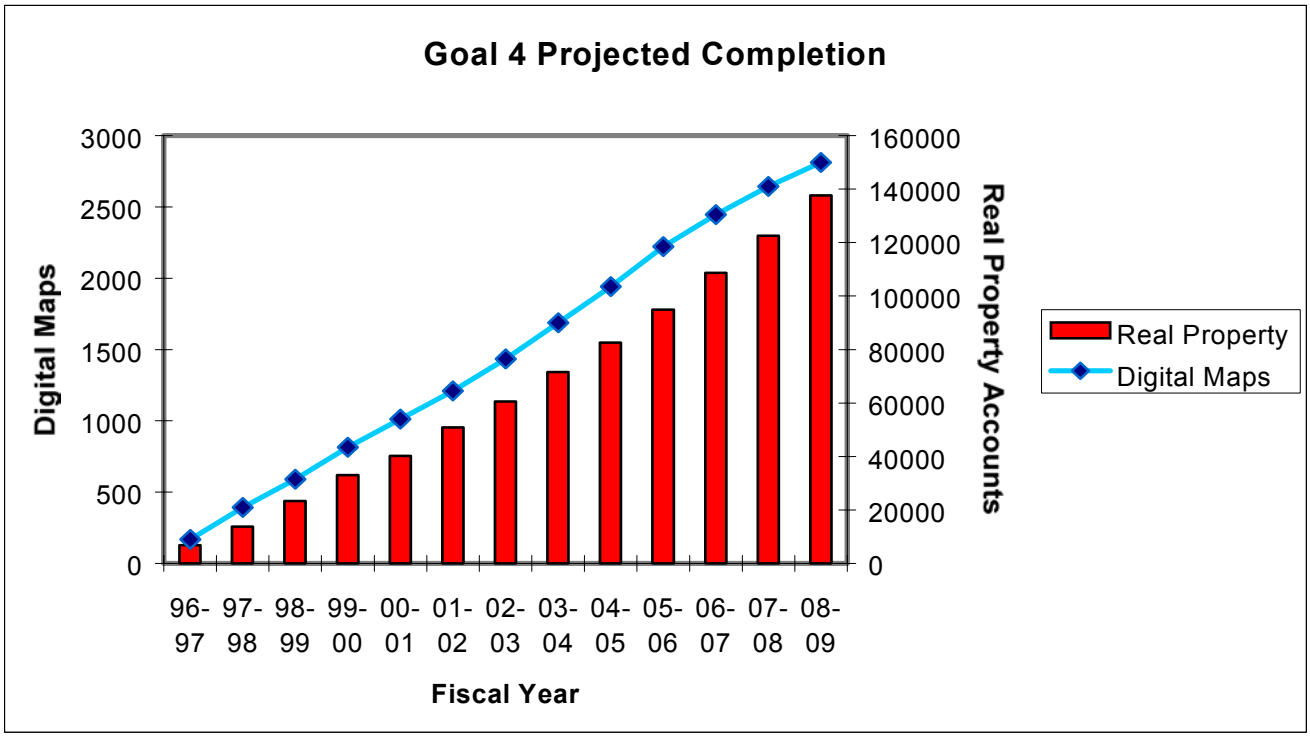
The acquisition of a countywide Digital Elevation Model (DEM) is for the primary purpose of controlling future orthophotos. The orthophotos will be used as a basis to adjust tax lots to natural features, rivers, streams, etc…. The area to be covered is approximately 727 sections. This DEM expands upon the existing DEM that Metro acquired in the summer of 2001, which created a DEM for all areas in the three county region within the urban growth boundaries. Some 260 square miles have been completed through the Metro efforts. As with the Metro project, the density of mass points will be sufficient to control orthophotos at a scale of 1:1600 (1 foot pixel size) and will have the future ability to generate 5 foot contours at a later date. The DEM to control current photography is a combination of several data sources and has been compiled by a vendor. Due to the proprietary nature of the DEM, we can not insure ORMAP accuracy standards. Establishing our own DEM will give confidence in the product required by ORMAP goals.

Summary:
Utilize software to automate or improve workflow
Leverage the use of scanned documents
Aerial photo/Digital Elevation Model Improvement

ORMAP Goal 4 Projected Timeline

Washington County's goal to complete ORMAP Goal 4 is based on the following timeline based on Accounts and Maps:

Goals by Maps						Goals by Accounts			
Year	% Complete	% Goal	% Total	Actual	Actual	Year	% Complete	% Goal	% Total
96-97	5%		5%			96-97	6%		6%
97-98	5%		10%			97-98	8%		14%
98-99	7%		17%			98-99	8%		21%
99-00	7%		24%			99-00	8%		30%
00-01	6%		30%			00-01	6%		36%
01-02	4%	7%	37%	34%	42%	01-02	6%	8%	44%
02-03		8%	45%	40%	48%	02-03		7%	51%
03-04		8%	53%			03-04		7%	58%
04-05		8%	61%			04-05		8%	66%
05-06		8%	69%			05-06		8%	74%
06-07		10%	79%			06-07		8%	82%
07-08		10%	89%			07-08		9%	91%
08-09		11%	100%			08-09		9%	100%



County Contact/Project Manager
Roger Livingston **503-846-3889** **Email:roger_livingston@co.washington.or.us**