State of Oregon
GIS Professional Certification Plan

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GIS Certification Committee

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EXECUTIVE SUMMARY

It is recommended that a professional certification program for GIS professionals be developed and implemented at this time. As stated by William E. Huxhold (2000), one of the pioneers of the GIS industry,

> "After 30 or more years of experience in implementing and using geographic information systems, the GIS professionalism in the US remains as it was back in the 1960s and 1970s: **no professional standards** for GIS professionals, **and no evaluation of educational programs** for institutions that confer GIS certificates on its graduates about to enter the GIS profession. Can it be that anyone can pass himself off as a "GIS Professional"? Worse, can it be that anyone can pass herself off as knowing what to teach the student of GIS? Have we not learned anything in 30 years that we should pass on to our successors in the field of geographic information systems?"

The industry has experienced a rapid and dramatic increase in growth in the last decade and the need for professional standards and a Code of Ethics has risen along with it.

Professional certification would provide a means for practitioner recognition by their peers, assist in the advancement of knowledge, and provide for advancement and better protection of the public good by encouraging higher levels of competency and ethics among professionals. It would create a basis for judging quality of work and adherence to a code of ethics. Certification will provide a high level of assurance that shared data has been collected, analyzed, and managed in a professional manner. It is clear that certification will further improve and expand the responsibilities, opportunities, and rewards that are available to those pursuing a career in GIS.

The proposed certification program recommends that senior GIS professionals, professionals responsible for delivering GIS products, and GIS professionals responsible for sharing data become certified. The program provides a detailed plan based upon a point-based system that is self-documented and calculated by the individual seeking certification. The points are earned through a combination of education, experience, and contributions to the community. At this time, certification is intended to be voluntary only and will not require an examination. It is also proposed that proof of continuing education and/or GIS activity will be required to renew the certification after a finite period of time.

The plan for certification is incremental, engages the professional community, and provides for review. Although there may be minimal costs incurred by implementing a GIS certification program, the benefits of doing so far outweigh any financial burden.

2. INTRODUCTION

This document contains a plan for local, regional, and state agencies to embrace the concept of certification for GIS Professionals.

The problem

At this time there is no actual "profession" for those dedicated to the GIS field. There is no standard of education, experience, ethics, work, or goals in existence. This leads to an – at best – chaotic interpretation of the field and expectations both for and towards those who have chosen GIS as their career path. Without a standard, there is no measuring bar to ascertain quality of performance or standards for the field. This confusion and lack of a measuring bar may result in substandard work, inefficiency, economic loss, and public injury, as well as a potential desertion of GIS expertise as those interested in the field seek alternative and more rewarding and defined career paths.

Proposed Solution

It is recommended that a professional certification program for GIS Professionals be implemented on a local, regional, and state level using the program developed and supported by Urban and Regional Information Systems Association (URISA). Senior GIS professionals, professionals responsible for creating products or sharing data should be encouraged to become certified. This certification would be awarded based upon a combination of experience, education, and contributions to the community. Certification would be granted for a specific period of time with renewal options available at the close of the certification period. Part of the certification is a code of ethics program that sets standards for professional behavior.

History

Historically, the field of GIS has been in existence in one form or another for over thirty years. The 1990s saw a dramatic growth in the development of GIS applications and use. The technology is now used in a wide variety of areas including crime mapping and analysis, business applications, environmental protection, social services, and much more. The list of forums is limited only by one's imagination.

However, although GIS has grown exponentially, there are still no professional standards or a Code of Ethics for GIS practitioners. At this time anyone, with even minimal experience and education, can proclaim themselves to be a qualified GIS professional.

The issue of certification or licensing for GIS practitioners was first raised by professional land surveyors as a means to address the issue of responsibility in the early 1990s. Although certification was not created at that time, it has remained a topic of heated discussion amidst those involved in the field and in think tanks across the country.

3. JUSTIFICATION

There are a number of issues related to GIS professional certification that should be considered as Oregon moves forward with the development and potential implementation of a certification program. These issues include:

- The effect on agencies and organizations
- The political implications of inaction
- The potential impact on data quality
- The potential impact on data sharing

Effect on Agencies and Organizations

It is the strong belief of the OGIC Certification Committee that the financial advantages of GIS professional certification will far outweigh the costs of such a program to agencies and organizations, even in the short term.

Certification can provide recognition and satisfaction for a lifetime in a career activity. Individuals can advance through various levels of certification, receive honors and recognition and at the same time improve their performance and increase customer or client satisfaction.

Through preparation, instruction, procedural guidelines, and ethics statements, individuals with certification improve themselves and create more productive careers. This results in a positive impact on agencies and organizations that employ these individuals as well as in added value and cost savings to the organization. In addition, once certification is achieved it can indicate certain capabilities to clients and customers.

Data Sharing

Certification can provide a certain degree of assurance that shared data sets have been collected and managed in a professional manner that makes them useful, both for the purposes for which they were intended and for other diverse purposes.

It is often necessary and desirable to share data sets with other states and organizations outside Oregon. If these data sets are not collected and managed in a professional manner, it is more likely that the data sets will not be useful to our partners in adjoining states with whom we share certain business processes, such as emergency management, natural resources management and protection, and human services allocation.

Even more pressing is our need to share data between jurisdictions within Oregon. The same logic applies to sharing data across county boundaries, between counties and state agencies, between state and federal agencies, and between cities and counties. If data developed and managed by one jurisdiction or agency is to be shared with others, it needs to be managed in a professional manner consistent with best practices. The only way to

ensure that happens consistently across the state is to put a professional certification program in place and work to get the appropriate individuals certified.

The professional certification of individuals responsible for collecting and managing data sets helps to ensure that those individuals are properly trained and knowledgeable of best practices. This helps to assure our partners that their relationship with us is providing good value for their investment of time and effort in sharing their data sets with us. Without this assurance, data duplication would be required and would occur much more often.

Data Quality

Professional certification of individuals involved in data development will help to ensure that data developed for a particular purpose is useful for that purpose and for a variety of other purposes. Understanding of the issues related to data quality, how to determine the quality of data, how to develop data of a quality sufficient for a particular purpose, how to determine if data is of a quality sufficient for a particular purpose, and properly documenting the quality and pedigree of data one has developed, are all elements crucial to the proper use of data for making decisions, supporting conclusions, and solving problems.

Without the ongoing professional training ensured through a professional certification program, it is not possible to *consistently* rely upon the accuracy, quality, and validity of the data necessary to support critical decisions.

Consequences of Inaction

In addition to the points made above regarding the need for professional GIS certification, there are other consequences that will most likely result from inaction on this issue.

The GIS community, the photogrammetry community, the cartography community, and the surveying community have been working together for the past two years to resolve serious issues that have arisen due to conflicts between the practice of surveying and the use of GIS-related tools to create, analyze, and utilize data.

A key element of the solution derived by these four communities was professional GIS certification to help ensure that best practices and professional techniques were followed when data is developed, analyzed, and used by GIS practitioners. The solution, and the professional certification element, is intended to prevent harm to the public to the greatest extent possible.

If the GIS community does not follow through with the professional certification element of the agreed upon solution, the relationship with the other communities with which the GIS community must work closely now and in the future will be severely damaged. In addition, it is likely that one or more of those communities will pursue a statutory solution that will mandate a more extreme solution such as GIS professional licensure.

For all of the reasons stated above, the OGIC Certification Committee believes strongly that a professional GIS certification program in Oregon is justified. Furthermore, professional certification helps:

- Find the right people for the job
- Define the profession
- Assure quality
- Set a standard of competency
- Identify qualified individuals
- Ensure continued expertise
- Improve individuals marketability

4. USING URISA FOR CERTIFICATION

4a. GIS Certification – A Proposed Certification Plan from URISA

Since 1999, the Urban and Regional Information Services Association (URISA), along with the American Society of Photogrammetry and Remote Sensing (ASPRS) has been exploring the certification for GIS professionals for a national perspective. This effort involved numerous GIS practitioners as well as those in academia to develop a process where GIS professionals could be objectively evaluated as to their competency in GIS without focusing on a specific set of skills to pertain to particular software. Also, it was felt an independent body was needed to administer and coordinate this certification process. Thus, the birth of the GIS Certification Institute.

As Oregon looks towards GIS Certification, a committee of GIS professionals practicing with various employment sectors within the State evaluated the process of the GIS Certification Institute GIS Certification model and found the proposed model will satisfy many of the requirements for GIS Certification spelled out during meetings with surveyors, photogrammetrists, cartographers, as well as GIS practitioners.

The GIS Certification Institute program is a voluntary program that is intended to acknowledge the professional achievements of those people whose *primary job responsibility* involves the use of geographical data technology. It is not a program for general users of GIS technology. The program is a point-based system that is self-documented and calculated by the individual seeking certification. At this time, it does not include an examination.

Applicants must document points in three categories that record the individual's educational and professional accomplishments. The categories in which points may be earned consist of educational achievements, professional experience, and professional contributions. How these points are earned is detailed later in this document.

Once initial certification is obtained, the period of certification is finite. The Certified GIS Professional must maintain currency with the profession and document those activities periodically. Currently, the proposal for certification renewal designates a five year renewal period during which the candidate must earn additional points in each of the three achievement categories to remain certified. Failure to accomplish this renewal process will result in revoking his or her Certified GIS Professional recognition.

How GIS Certification Works:

To become eligible for GIS Certification through a system of points, 150 points must be compiled. As a candidate for GIS Certification compiles points in the three categories, a minimum number of points are required for each.

Educational Achievement: 30 points
Professional Experience: 60 points

Professional Contributions: 8 points

The core points total 98. An additional 52 points are required in any of the above categories, or in a combination of the three, to gain the 150 points for initial certification. Of the three categories, experience is the most important factor in applying skills to real world problems, hence commands the majority of points for certification. Education also plays an important role in providing the knowledge and intellectual maturity required to approach problems and communicate solutions effectively. Yet experience and education alone do not make a well rounded GIS Professional. Professionals must contribute to the advancement of the profession by donating their skills in professional efforts not designed for individual compensation, but rather to maintain the fundamental health of the profession.

The GIS Certification points are based on a model GIS Professional with the following attributes: a baccalaureate degree in any field supplemented with a number of courses, workshops, seminars, conferences, and other documented educational activities whose subject matter relates directly to GIS and geospatial data technologies; at least four years experience in a position that involves spatial data compilation in GIS analysis, design, or programming, teaching, etc. (simply being a GIS user will require more years of experience); and a modest record of participating is GIS conferences, publications, or GIS-related events (such as GIS Day).

GIS Certification Details:

Education Points-

While formal educational experiences may not contribute as much as experience to a GIS Professional's qualifications, they certainly do have the potential to be a valuable means of acquiring the knowledge, skills, and dispositions that individuals need to be successful in any profession. Please note that the GIS Certification Institute is not an accrediting body and, therefore, will not attempt to evaluate the quality of educational institutions or programs. Instead, it will ensure that individuals who seek certification have successfully participated in a minimum of relevant, formal, educational experiences.

Minimum educational achievement: As described above, the Certification model is based on the candidate possessing the equivalent of a baccalaureate degree in any field supplemented with GIS-related education. While possessing a baccalaureate degree does not guarantee that individuals have the knowledge and skills required to be effective GIS practitioners, the four year degree provides the opportunity to develop the intellectual maturity required to approach complex problems systematically and critically, as well as the communication skills needed to articulate not only the capabilities and benefits of GIS technology, but also its limitations. Practitioners without a formal degree can fulfill education point requirements through an equivalent combination of credit and non-credit courses and workshops.

The Educational Point Schedule consists of two parts:

- Credential Points: points earned through successful completion of a formal degree or certificate program offered by accredited educational institutions; and
- Course Points: points earned through successful completion of individual courses, workshops, and other formal, documented educational activities whose subject matter relates directly to GIS science, technology, and/or applications.

Applicants may claim a total number of Education points equal to the sum of Credential Points plus Course Points. The minimum number of Education points required for certification is 30 points. The maximum number of Education points is 82 (30 for the minimum plus the additional 52 beyond the minimums for the combination of Education, Experience, and Contributions).

Credential Points: Applicants may claim credential points equal to the value of the highest degree or certificate earned.

- Masters degree or higher = 25 points
- Bachelors degree = 20 points
- Associate degree = 10 points
- GIS Certificate = 5 points

Course Points: In addition to Credential points, applicants may claim Course Points for any GIS related course, workshop, or other documented formal educational activity. The number of points earned per course or workshop is proportional to the number of Student Activity Hours (the time that a student spends both inside and outside the classroom completing reading or homework assignments, studying, or other preparations) that each course entails. To calculate Student Activity Hours offered by colleges and universities, multiply the number of credits for an individual course times three (this is a standard estimate for student activity per credit hour) and then multiply the result by the duration of the course in weeks. One Course Point is awarded for every 40 documented Student Activity Hours. Course points can be acquired from credit or non-credit college courses, non-credit courses offered by a private company, attendance at educational sessions at a professional conference, and pre-conference workshops that focus specifically upon GIS science, technology, and/or applications. All Course Points must be documented as to type and attendance. Relevant courses may be counted even if they were completed as part of a degree or certificate program for which the applicant has also claimed Credential Points.

Experience Achievement Points:

Job experience it the most important factor contributing to an individual's qualifications because performing in the job gives one opportunities to become skilled at the application of GIS technology to real world problems. Failures as well as successes in these contexts provide valuable learning experiences that, in turn, allow growth and expansion of skill sets. In addition, the professional working environment -- where one is often working with other GIS Professionals who have different skills and different experiences -- provides opportunities to gain knowledge from one's own peers. Since these interactions

are so important to the development of a GIS Professional, four years of experience will be the minimum number of years required for GIS Certification.

The closer one's job is to GIS analysis and design, the more credit should be given for those experiences. Data compilation, teaching, and similar responsibilities are jobs that do not require as broad an application of the technology as are jobs that professionals hold towards the beginning of their careers. Thus, they have not been exposed to such valuable learning experiences as GIS analysis and design and should not receive as much experience credit. Finally, an individual in a position that is considered a "User" of GIS software requires even more time to gain exposure to the number of experiences that provide skill development opportunities. An additional category of experience is added to account for supervisory or management GIS-related positions. Personnel supervision and project management experiences offer additional skill development opportunities that are valuable in a professional's qualifications. Therefore, points are awarded for the number of years in a supervisory and/or management position in addition to the years spent in more technical positions.

Since it is possible to have experiences in all of the categories, points in all four of the following categories are added together to determine the total number of Experience Points one has attained.

- Points for years in a GIS position of data analysis, system design, programming, or similar GIS position
    - Number of years times 25 points per year
- Points for years in a GIS position of data compilation, teaching, or similar position
    - Number of years times 15 points per year
- Points for years in a GIS users position
    - Number of years times 10 points per year
- Points for years in a GIS supervisory or management position
    - Number of years times 10 points per year

60 points are required as a minimum for GIS Certification with a maximum of 112 points allowed in Experience Points.

Contribution Points:

The GIS Certification Program is an opportunity to define the profession of GIS. However, the program should not be used as a personal yardstick for career development. As such, it must be recognized that professional contributions in the form of conference planning, publications, committee/board participation, outreach, and other related efforts are fundamental to the health of any profession.

In general, it is expected that an active professional is capable of attaining a minimum of two Contributions points per year. It is recognized that the less experienced, younger professional has not yet had opportunities for acquiring Contribution Points so the

number of points required to initially gain GIS Certification is deflated. As renewal certification for a GIS Certified individual is discussed, Contribution Points become weighted heavier.

Contribution Points may be attained for the following activities:

- GIS Publications:
  Publication Type:
  - Book author/editor # of books times 15 points per book
  - Published atlas # of atlases times 15 points per atlas
  - Refereed paper # of papers times 5 points per paper
  - Published map # of maps times 5 points per map
  - Editorial Board # of years times 3 points per year
  - Article # of articles times 3 points per article
  - Paper in conference proceedings # of papers times 2 points per paper
  - Newsletter article # of articles times 1 point per article

Note that professional writing is credited as Experience. Publication of theses and dissertations is credited as Education

- GIS Professional Association Involvement:
  Level of Involvement
  - Presidency # of terms times 5 points per term
  - Board membership # of terms times 4 points per term
  - Committee membership # of terms times 3 points per term
  - Committee participation # of terms times 2 points per term
  - Association membership # of terms times 1 point per term

- GIS Conference Participation:
  Level of Involvement
  - Conference chair # of conferences times 4 points per conference
  - Conference committee # of conferences times 2 points per conference
  - Presentation/poster # of conferences times 1 point per conference

- GIS Awards Received:
  - Employment award # of awards times 1 point per award
  - Local/regional/state award # of awards times 2 points per award
  - National award # of awards times 3 points per award

- Other GIS Contributions:
  - Event organization # of events times 2 points per event
  - Event participation # of events times 1 point per event
  - Related community contributions # of events times 1 to 3 points per event

For initial GIS Certification, 8 points are required.

Certification Renewal:

In order to retain certification, the Certified GIS Professional must maintain currency with the profession and document those activities periodically. He or she must earn additional points in each of the three achievement categories within five years of initially being certified or previously renewed to remain certified. If the Certified GIS Professional fails to earn the minimum renewal points during that period, then he or she is no longer considered professionally certified by the GIS Certification Institute. The number of points required for certification renewal is being evaluated by the GIS Certification Institute as to the breakdown of required points in each achievement category.

4b. The GIS Code of Ethics

The GIS Certification Institute has developed a Code of Ethics to guide GIS Professionals in making appropriate and ethical choices. It should provide a basis for evaluating their work and the work of peers from a moral point of view. By following this code, GIS Professionals will help preserve and enhance public trust in the discipline. The Code of Ethics also may be used to sanction Certified professionals if they deviate significantly from the Code's foundations.

What makes this Code of Ethics so unique is that GIS is regarded by many as a tool used by several primary disciplines. It is only recently that GIS has become a professional in and of itself. Often the users of GIS are governed by a separate Code of Ethics. The GIS Certification Institute looked at many other professional codes and created a code that compliments other professions.

The GIS Certification Code of Ethics describes the moral and ethical issues that may be faced by a GIS Professional. These obligations to the practice of GIS are broken into 4 major categories; Obligations to Society, Obligations to Employers and Funders, Obligations to Colleagues and the Profession, and Obligations to Individuals.

Obligations to Society: The GIS Professional recognizes the implications of his or her work on society as a whole, subgroups of society including geographic or demographic minorities, and on future generations as well as today's society. Obligations to society shall be paramount when there is conflict with other obligations. Therefore, the GIS Professional will:

- Do the Best Work Possible
    - Be objective, use due care, and make full use of your education and skills.
    - Practice integrity and not be swayed by the demands of others.
    - Provide full, clear, and accurate information.
    - Strive to do what is right, not just what is legal.
- Contribute to the Community to the Extent Possible

    - Make your data and findings widely available.
    - Strive for broad citizen involvement.
    - Donate your services to community organizations.
- Speak Out About Issues
    - Give your opinion about public issues related to personal expertise.
    - Call attention to unprofessional work of others.
    - Admit when you have made a mistake.

Obligations to Employers and Funders: The GIS Professional recognizes that he or she has been hired to deliver needed products and services. The employer (or funder) expects quality work and professional conduct. Therefore the GIS Professional will:

- Deliver Quality Work
    - Be qualified for the tasks you accept.
    - Keep current in the field through readings and professional development.
    - Identify risks and the potential means to reduce them.
    - Define alternative strategies to reach employer/funder goals, if possible, and the implications of each.
    - Document your work so that it can be used by others. This includes metadata and program documentation.
- Maintain a Professional Relationship
    - Hold information confidential unless you are authorized to release it.
    - Avoid all conflicts of interest with clients and employers.
    - Avoid soliciting, accepting, or offering any gratuity or substantial benefit connected to a potential or existing business or working relationship.
    - Accept work reviews as a means to improve your performance.
    - Honor your contracts and assigned responsibilities.
    - Accept their decisions, unless they are illegal or unethical.
    - Help develop security, backup, retention, and disposal rules.
    - Acknowledge and accept rules about the personal use of employer resources.
- Be Honest in Representations
    - State your professional qualifications truthfully.
    - Make honest proposals that allow the work to be completed for the resources requested.
    - Deliver an hour's work for an hour's pay.
    - Describe products fully.
    - Be forthcoming about limitations of your work.

Obligations to Colleagues: The GIS Professional recognizes the value of being a part of a community of other professionals. Together, we support each other and add to stature of the field. Therefore, the GIS Professional will:

- Respect the Work of Others
    - Cite the work of others whenever possible and appropriate.
    - Honor the intellectual property rights of others.

    - Accept and provide fair critical comments on professional work.
    - Recognize the limitations of your knowledge and skills, be aware of the skills of other professionals, and draw on them to complement your expertise as needed.
    - Work smoothly and capably with others in GIS and other disciplines.
    - Respect existing working relationships.
    - Deal honestly and fairly with prospective employees, contractors, and vendors.
- Contribute to the Discipline
    - Publish results so others can learn from your contributions.
    - Volunteer your time for local or national professional, educational, and organizational efforts.
    - Support individual colleagues in their professional development.
    - Report unprofessional activity.

Obligations to Individuals: The GIS Professional recognizes the impact of his or her work on individual people and will strive to avoid harming anyone. Therefore, the GIS Professional will:

- Respect Privacy
    - Protect individual privacy, especially regarding sensitive information.
    - Be especially careful with new information created about an individual through GIS-based manipulations or the combinations of two or more databases.
- Respect Individuals
    - Encourage individual autonomy.
    - Avoid undue intrusions into the lives of individuals.
    - Be truthful when disclosing information about an individual.
    - Treat all individuals equally, without regard to race, gender, or other unique characteristics.

5. IMPLEMENTATION PLAN

By using the certification process developed by URISA there will be no direct impact on organizations in Oregon for managing certification. Applying for certification, certification review, ethics reviews, and other operational aspects will be managed by URISA. A certified individual only needs to provide proof of certification. The following steps will be used for adopting certification.

5a. Who Should Be Certified

Senior professionals who are responsible for managing GIS programs or supervising the production of products (digital or paper) for the public or other organizations should be certified.

5b. Professional Adoption

This year URISA, OGISA, and other geoprocessing organizations will review and endorse the certification process for professionals in Oregon.

5c. OGIC Adoption

In the fall of 2003, or after professional organizations adopt certification, OGIC will state that URISA certification is important and recommends:

- GIS Professionals use URISA certification.
- Departments make certification desirable for hiring, contracting, standard product development, and grant development.
- Departments make professional certification ethics desirable as part of personnel evaluation.

5d. Outreach

Certification is a new concept for much of the GIS community. The who, what, where, when and why, of Certification will need to be conveyed. This will take several forms, as GIS practitioners work in diverse areas.

The easiest way to reach many practitioners is through the various State and local GIS organizations. In workshops, conferences, and local meetings, the concept of Certification can be presented. In addition, national publications and organizational newsletters provide an efficient method for introducing Certification to the broader community.

Some practitioners may not be members of GIS organizations or participate in meetings. This is recognized by URISA's stance of not requiring URISA membership to obtain Certification. These practitioners often belong to other organizations through which the

concept of Certification can be conveyed. Governmental entities such as the League of Oregon Cities, Association of Oregon Counties, Oregon Geographic Information Committee, and various Federal Committees represent practitioners in diverse fields. Oregon's colleges and universities provide contact with both students and faculty using GIS. Organizations representing various professions include practitioners working in both the public and private sector. All of these represent channels for conveying the concept of Certification as broadly as possible.

5e. Implementation

2004: Departments, contractors, and other agencies support certification and add language making certification desirable when:

- Hiring
- Contracting
- Providing grants
- Evaluation performance
- Producing standard products.

5f. Review

2005: OGIC will review certification progress and impacts.

6. IMPACTS

The impact on government and private industry will be positive as identified in the following subsections.

6a. Existing Employees

All government agencies with GIS programs should be encouraged to have at least one person on staff that is certified through the GIS Certification Institute (GISCI). The Institute is a national organization created as a separate entity from the Urban and Regional Information Systems Association (URISA) organization to administer the certification process. Certification is not a requirement but a desired professional recognition encouraged by OGIC and should add no cost to the agency. Expenses incurred in the certification process will be the responsibility of the employee.

Current Practice: Currently job titles and descriptions for GIS Professionals have wide discrepancies.
Change: Higher level GIS job descriptions could reference the certification as being highly desirable.
Pros: Provide a common way for different organizations to reference a similar set of job skills.
Cons: May impact salary levels.
Fiscal: Will decrease costs associated with job definitions and may increase salary levels.

6b. Hiring

All agencies that use GIS technology should be encouraged to identify where certification is needed. This will normally be staff providing leadership for GIS programs or projects. The following statement should be added to recruitment notices and position descriptions: "GIS Certification is desired through the GIS Certification Institute". This will be used to help meet the goal of one staff member being certified in each GIS program. This should not result in additional cost to the agency because GIS certification is desired and not required. A similar practice is used by Information Systems organizations with no additional cost to the agencies.

Current Practice: Currently hiring individuals and skill sets for GIS positions is diverse between organizations. It is often difficult to screen candidates.
Change: Higher level GIS job descriptions could reference the certification as being highly desirable.
Pros: Simplify hiring process.
Cons: May impact salary levels.
Fiscal: Will decrease time associated with identifying good candidates.

6c. Personnel Management

All agencies that use GIS technology should review the Code of Ethics and explore how they could be used to support personnel management issues. The GIS Code of Ethics should fit with existing personnel policies in place at this time.

Current Practice: Currently personnel management of existing employees is difficult. No clear statement for continuing education or expected ethics exists. In addition, many organizations have continuing education as an activity. However, it is difficult to ascertain what education is needed and where.
Change: Higher level GIS job descriptions could reference education requirements and ethical behavior as being highly desirable.
Pros: Clarify personnel management.
Cons: Continuing education may be a cost that the organization has to bear.
Fiscal: May have small educational or conference registration costs.

6d. Contracting/Contractors

Language should be added to contracts that include GIS application or data development activities indicating it is the State's desire that GIS work performed under said contract be overseen or verified by GISCI certified staff. As certification is integrated into the GIS profession, agencies may begin to require GIS Certification on some or all projects. It is anticipated that this will take several years as the certification and testing process are just now being developed.

Current Practice: Currently identification of qualified contractors and evaluation of contractor work is variable and dependent upon the organization. Identifying quality contractors and resolving inappropriate practices is a difficult process at this time.
Change: Making it highly desirable to a contractor for work to be done under supervision of a certified person will help identify qualified contractors and will provide a mechanism to address work that may be inappropriate.
Pros: Clarify contracting.
Cons: May raise cost for some contract work – if a contractor needs it you will generally pay for it. Formally addressing problems with work will take time. Should reduce risk.
Fiscal: May have an increased cost for doing some work but will also reduce risk of receiving bad work.

6e. Product evaluation

Agencies that produce GIS products should be encouraged to identify when products are produced under the supervision of a GIS Professional. This should be a very simple statement that may be included with the produced metadata that is attached to the product in either digital or manual form such as being a part of the standard product disclaimer. The inclusion of this text should have little impact on GIS production costs.

Current Practice: Currently we have no real mechanism to evaluate the quality of a product nor a method to resolve issues of poor quality.
Change: Making it desirable that official product from an organization, like framework, be developed under the supervision of a certified individual will assist organizations in evaluating a product and will provide a mechanism for resolving issues.
Pros: Assist in evaluating product quality and assist in resolving products that have poor quality.
Cons:
Fiscal: May raise cost of producing some products but will also reduce the risk and costs associated with poor quality products.

6f. Improved profession

GIS Professionals should be encouraged to participate in this program. It will give the GIS profession better standing with other professional groups in Oregon. This will reduce some of the confusion that exists today amongst the professions.

Current Practice: Currently we have no profession. We have a collection of individuals who use a collection of similar tools to do many things.
Change: Certification will define our profession.
Pros: Gives GIS Professionals an identity that in turn will help GIS Professionals address issues with other organizations and policy makers.
Cons:
Fiscal: Professionals will bear the costs of improving the profession.

6g. Private Contractors

Private contractors should be encouraged to employ certified individuals. This will occur by following the state's leadership in embracing certification and by adding desirable language to contractor selection procedures.

Current Practice: Currently private contractors occasionally have difficulty evaluating requests for service from organizations. It is difficult to know if the organization requesting the work knows what they are asking for. It is also sometimes difficult to help the potential client understand your organization's professional certification.
Change: Making it desirable that organizations have certified staff (both contractor and client) will clarify what professional capabilities each person has.
Pros: Clarify professional capabilities of organization.
Cons: Organization may bear some costs for certification and continuation of certification.
Fiscal: Increased cost for implementation. Reduce costs associated with risk. .