How Good are Your Data and Analyses? Communicating Quality

Part 3 of 3: Analysis

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Introduction

Question

How we can be accountable to ourselves and others with respect to GIS analyses and processes?

Rationale

- Efficiency & cost savings
- Legal requirements
- Karma

Approach

- Consider typical scenarios
- Explore some frameworks to help us think about GIS analyses and processes
- Provide some helpful suggestions

Images: http://www.cl-events.com/Events/cost-saving-tips.aspx, http://2.bp.blogspot.com/-RwvlE_vHKNo/T_iYNq1czPI/AAAAAAAAA_U/bD85qFrnSUM/s1600/YB-C01_KeepKarma_.jpg, http://www.esqwire.com/Files/law.jpg

Possible Scenarios

Start clicking

Have to start from scratch

Don't keep notes

How realistic are they?

Images: http://www.wsfa.org/journal/j97/5/, http://www.technotraits.com/wp-content/uploads/2008/08/notepad-logo.jpg, http://www.joop.in/wp-content/uploads/2007/10/start_from_scratch_by_snogo.jpg

More Possible Scenarios

Create/buy custom procedures

Become obsolete

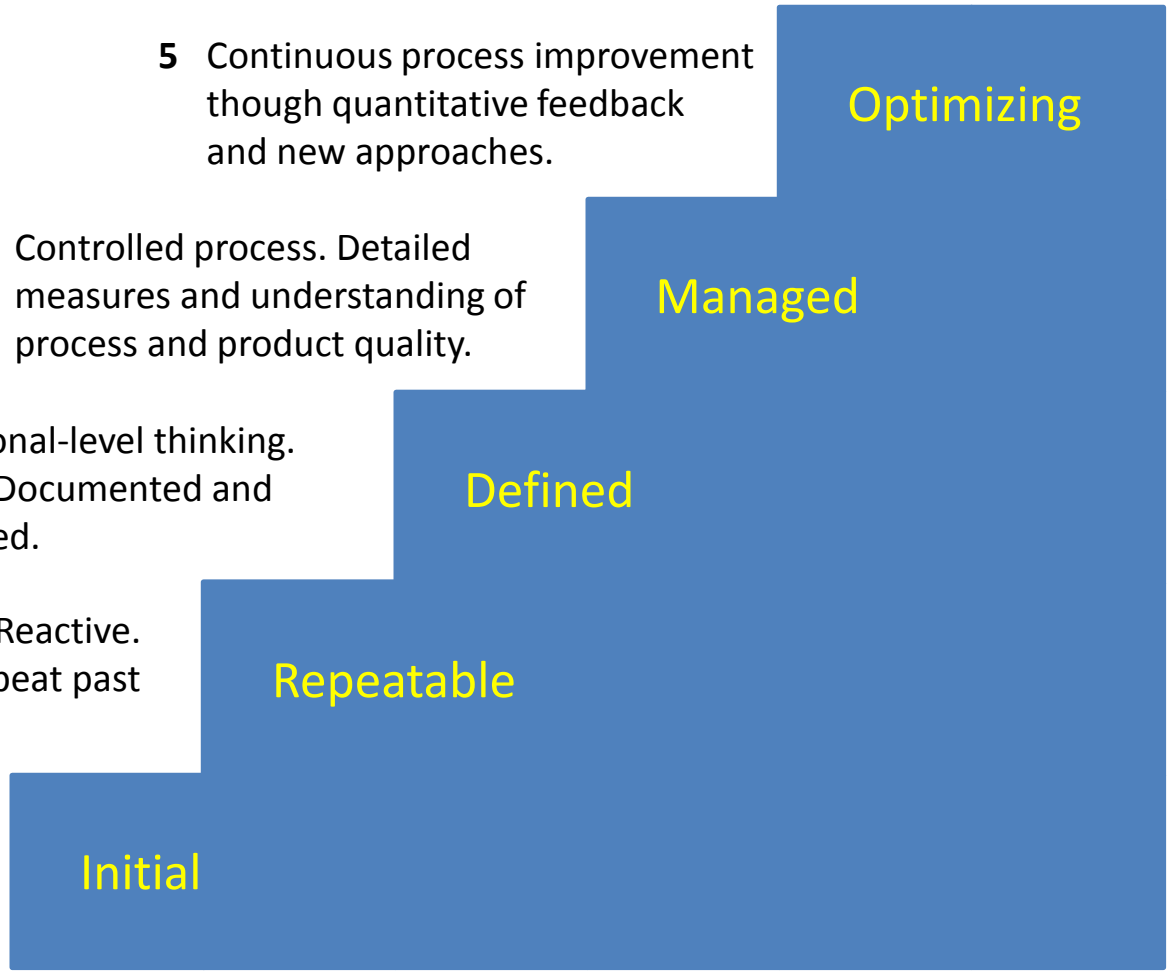
- seen as waste of money

Reluctance to invest in other methods

How common is this?

Images: http://inmotionjoe.files.wordpress.com/2013/02/one-size-does-not-fit-all.jpg, http://telcontar.net/global/obsolete.png, http://nationalcreditfederation.com/blog/wp-content/uploads/2010/08/money_down_drain.jpg

Capability Maturity Model



Source: http://flylib.com/books/en/4.223.1.171/1

Capability Maturity Model

For data

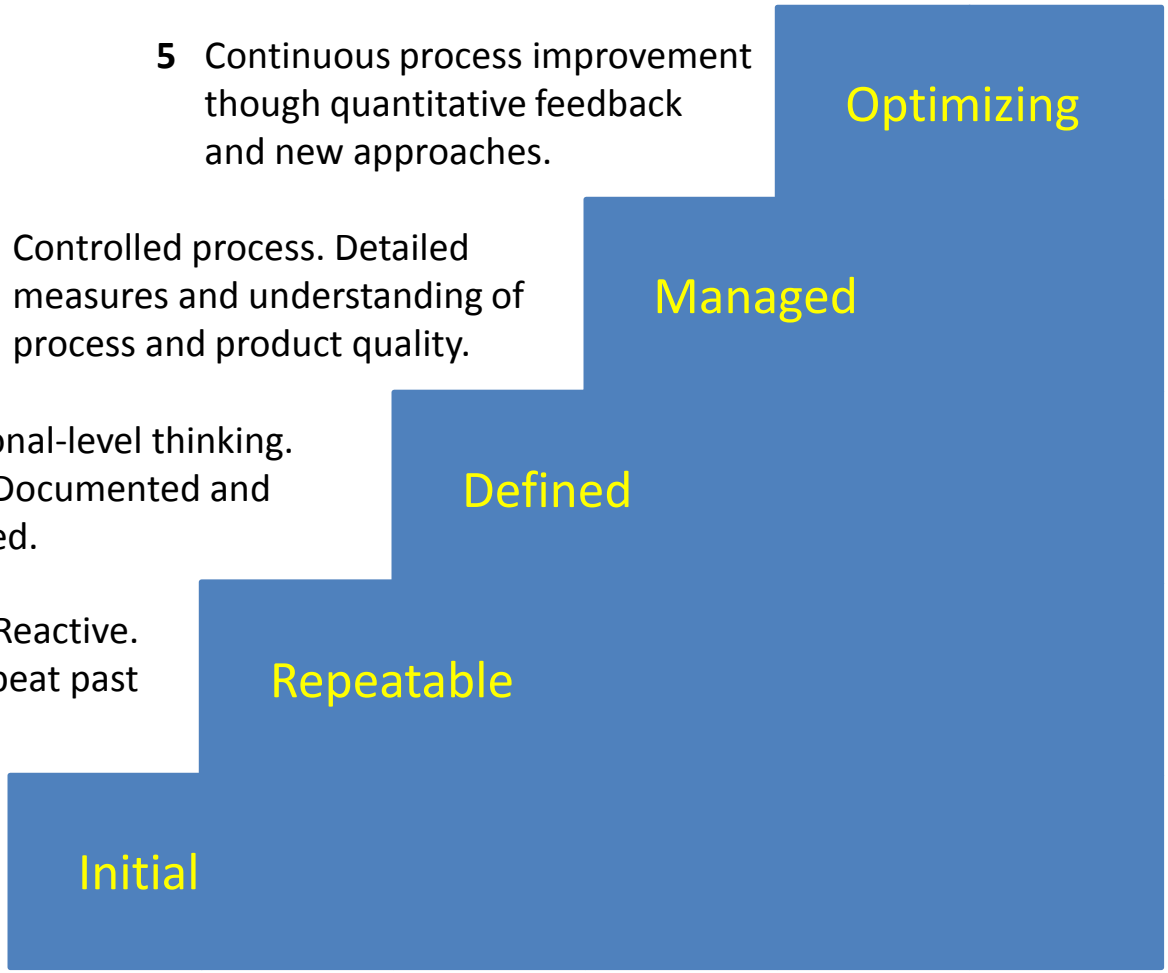
5 Continuous process improvement though quantitative feedback and new approaches.

4 Controlled process. Detailed measures and understanding of process and product quality.

3 Organizational-level thinking. Proactive. Documented and standardized.

2 Project-level thinking. Reactive. Similar projects can repeat past success.

1 Ad hoc and chaotic process. A project's success depends on heroes and luck.



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Capability Maturity Model

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For processes

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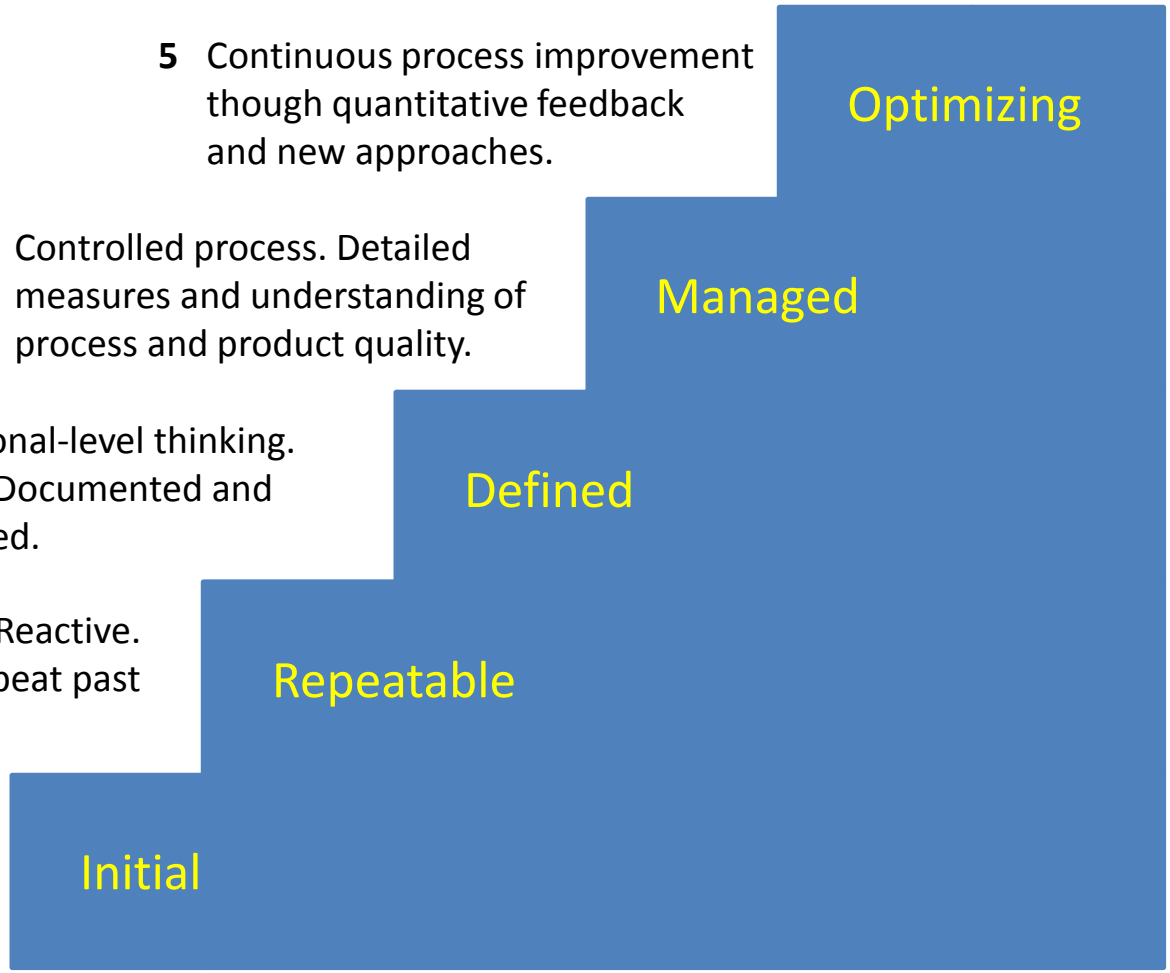

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Capability Maturity Model

For data
For processes
For way of thinking

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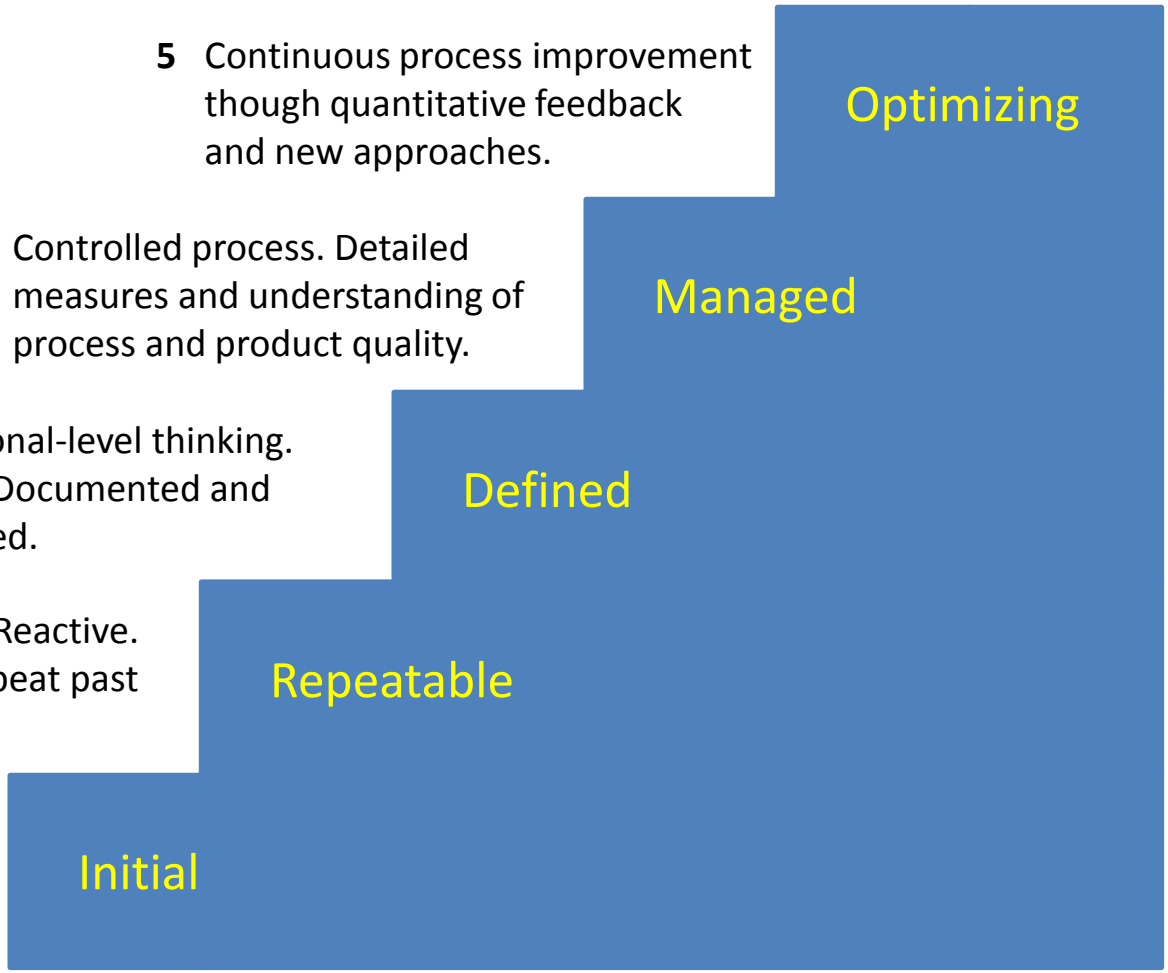

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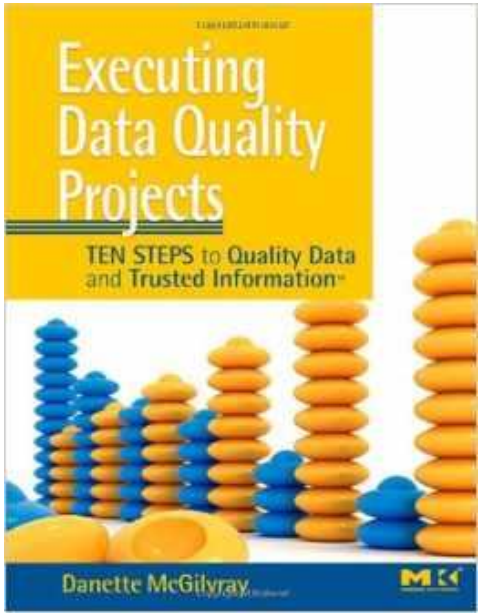
McGilvray's Data Dimensions

1. Data Specifications
2. Data Integrity Fundamentals
3. Duplication
4. Accuracy
5. Consistency and Synchronization
6. Timeliness and Availability
7. Ease of Use and Maintainability
8. Data Coverage
9. Presentation Quality
10. Perception, Relevance, and Trust
11. Data Decay
12. Transactability



Process Dimensions

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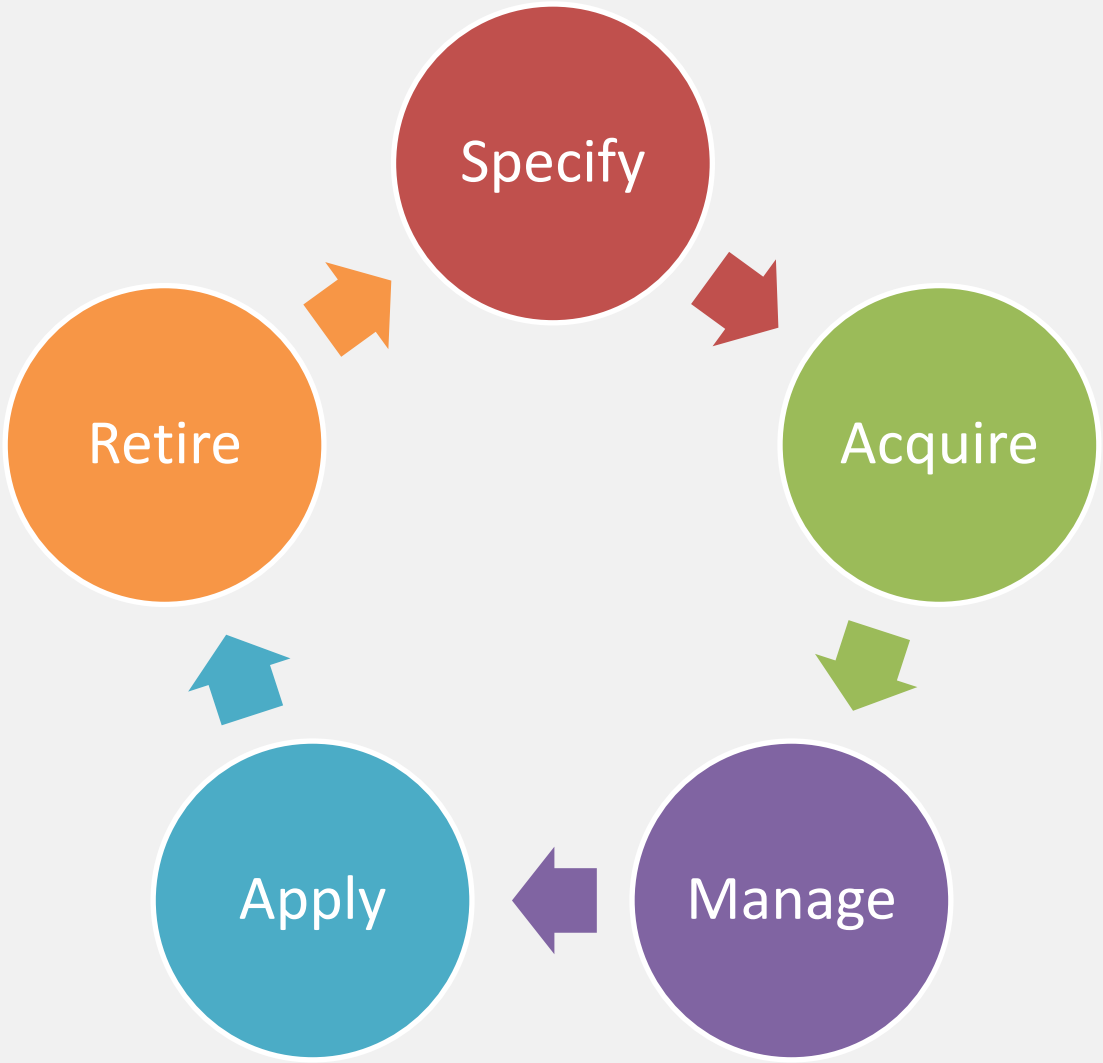
Information Lifecycle



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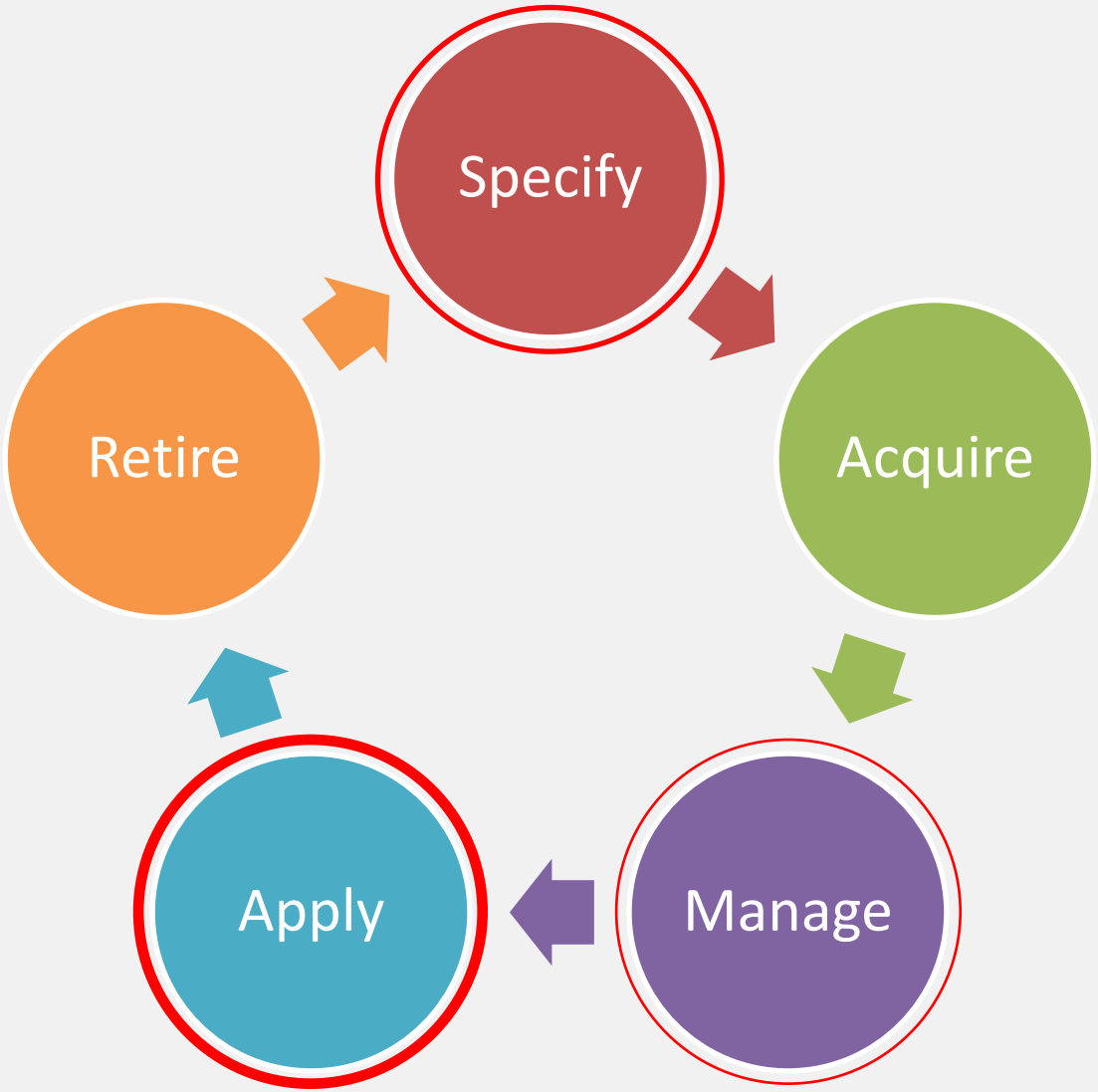

Relevant Data Dimensions

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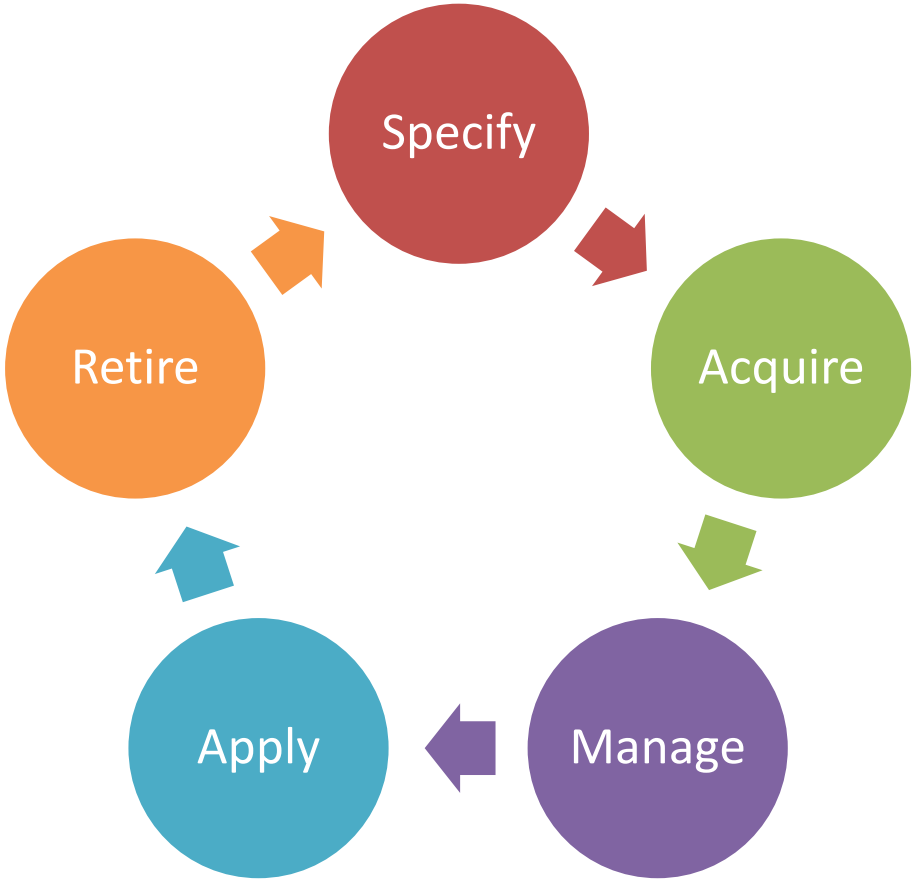

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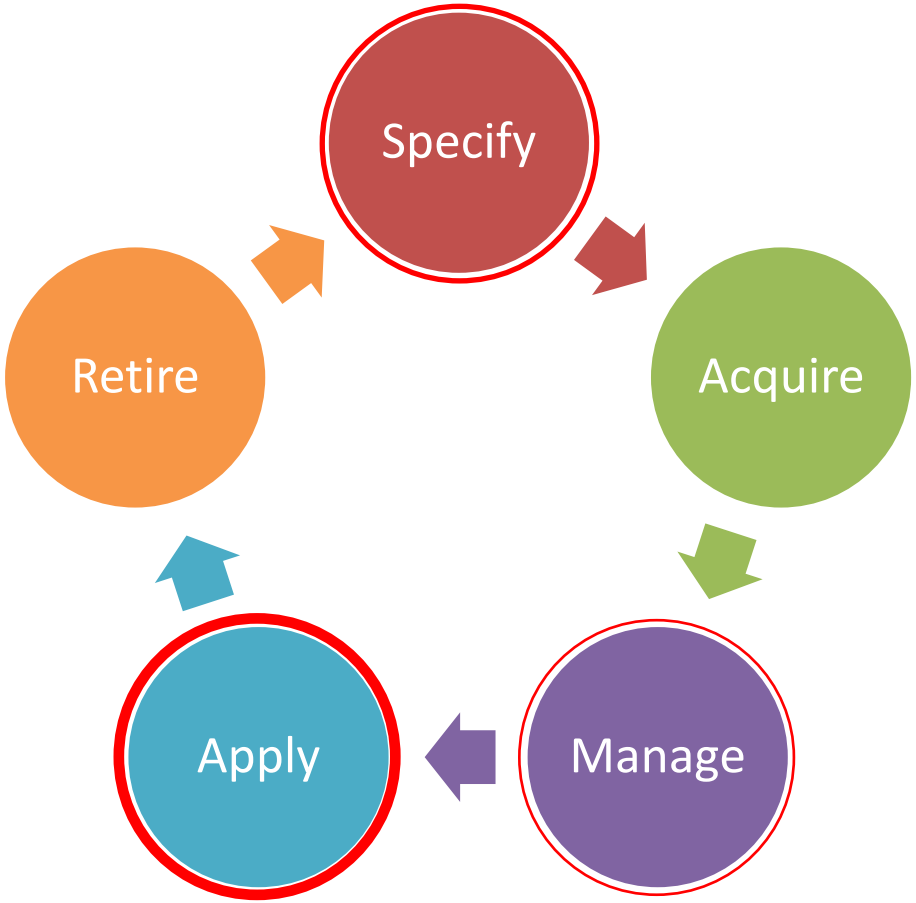

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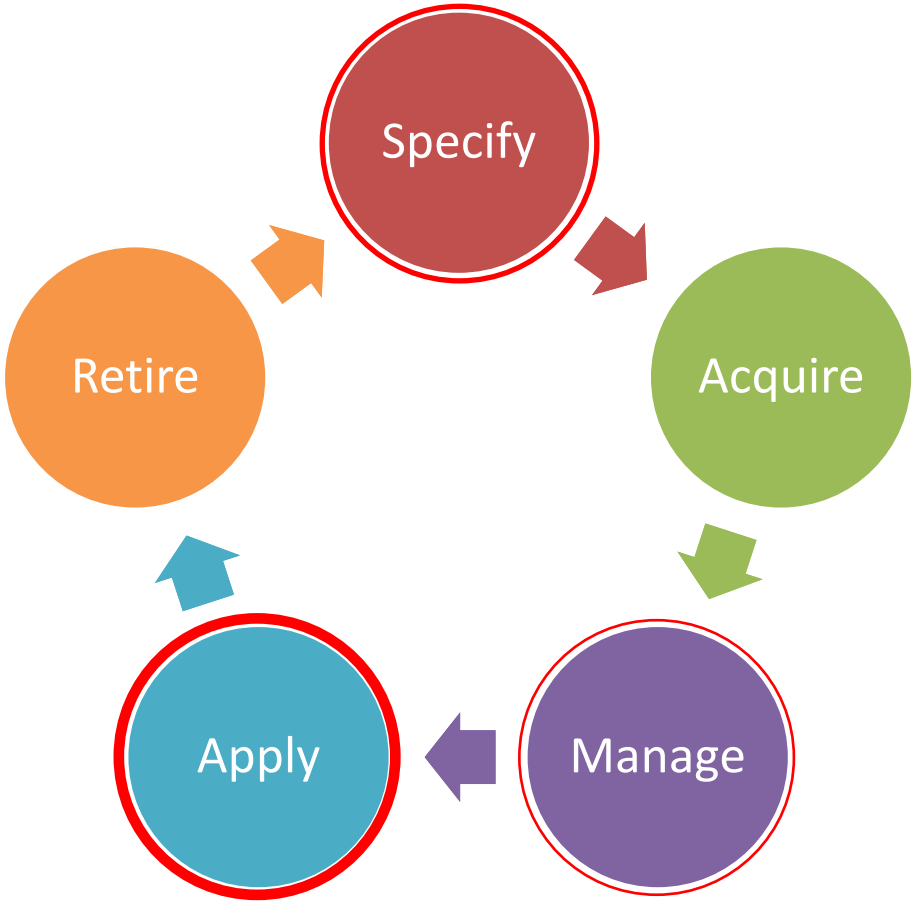


Incorporated Documentation - Concept

- Need to come up with methods for keeping track of what we do that
  1. Aren't onerous
  2. Have strong positive benefits

3. Can be measured to assess the extent of 1 and 2

- *Incorporated documentation* - incorporate/ embed documentation into processes

Image: http://positiverecognition.wordpress.com/page/3/, http://www.lotos-euros.nl/doc/documentation1.jpg

Incorporated Documentation - Benefits

- Helps improve ways of going about a task
- Adopt a cookbook approach
  - Think through whole process before you execute it
  - Develop a recipe
  - Refine it and apply it
- Aids project management

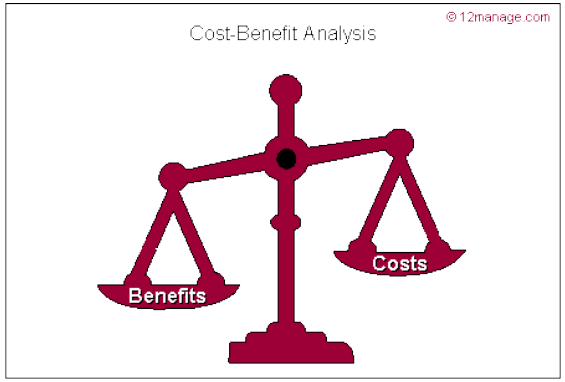
Image: http://manwifeanddog.com/wp-content/uploads/2012/05/recipe-book1.gif

Incorporated Documentation - Strategy

- Make documentation a central part of workflow and allow time and money for it

- Sell your case

- Conduct cost-benefit analysis



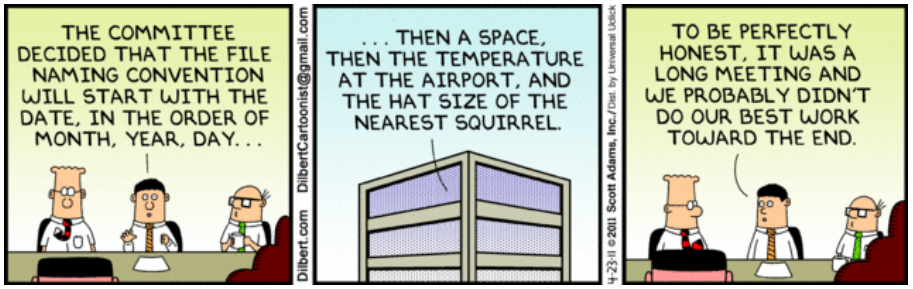
Images: http://bogardpress.org/oldvbs/vbs2009/clipart2/suitcase_old_brown.jpg, http://clbusiness.files.wordpress.com/2013/02/picture_cost_benefit_analysis.gif

Incorporated Documentation - Tactics

- Organize work carefully

- Create well-thought-out folder/data structures

- Adopt naming conventions



Images: http://www.goldstandardmanagement.org/images/organize.jpg, http://articulate-downloads.s3.amazonaws.com/powerpoint/bluefolder/folder-590.jpg, http://3.bp.blogspot.com/-my0di_JDdTk/TbXpTkfxZDI/AAAAAAAABTc/s9ix4WZQycE/s1600/file-naming-convention-110423.gif

Incorporated Documentation - Tactics

- Create supporting documents

- Explain process to others

- Build up a repository of methods

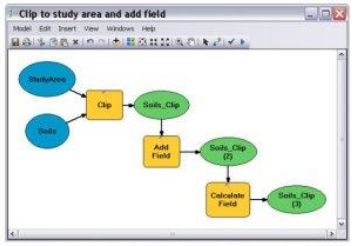
Documentation can become second nature

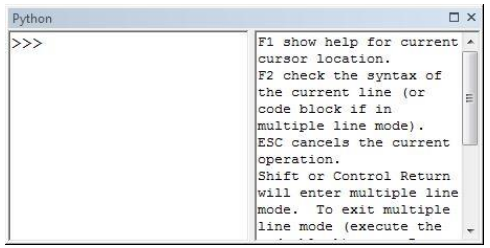
Images: http://www.idealscorp.com/Resources/Services/DocumentRepository/DocumentRepository.jpg, http://www.chainbridgetech.com/Images/documents.jpg, http://b.vimeocdn.com/ps/237/026/2370260_300.jpg

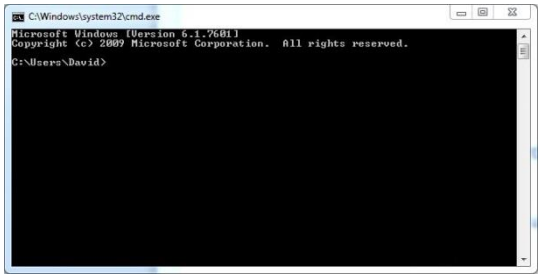
Incorporated Documentation - Tactics

Keep record of actions

- Esri
  - Use ModelBuilder
  - Use Python command prompt
    - copy/paste into supporting document
  - Create scripts/programs using Python
  - or other languages



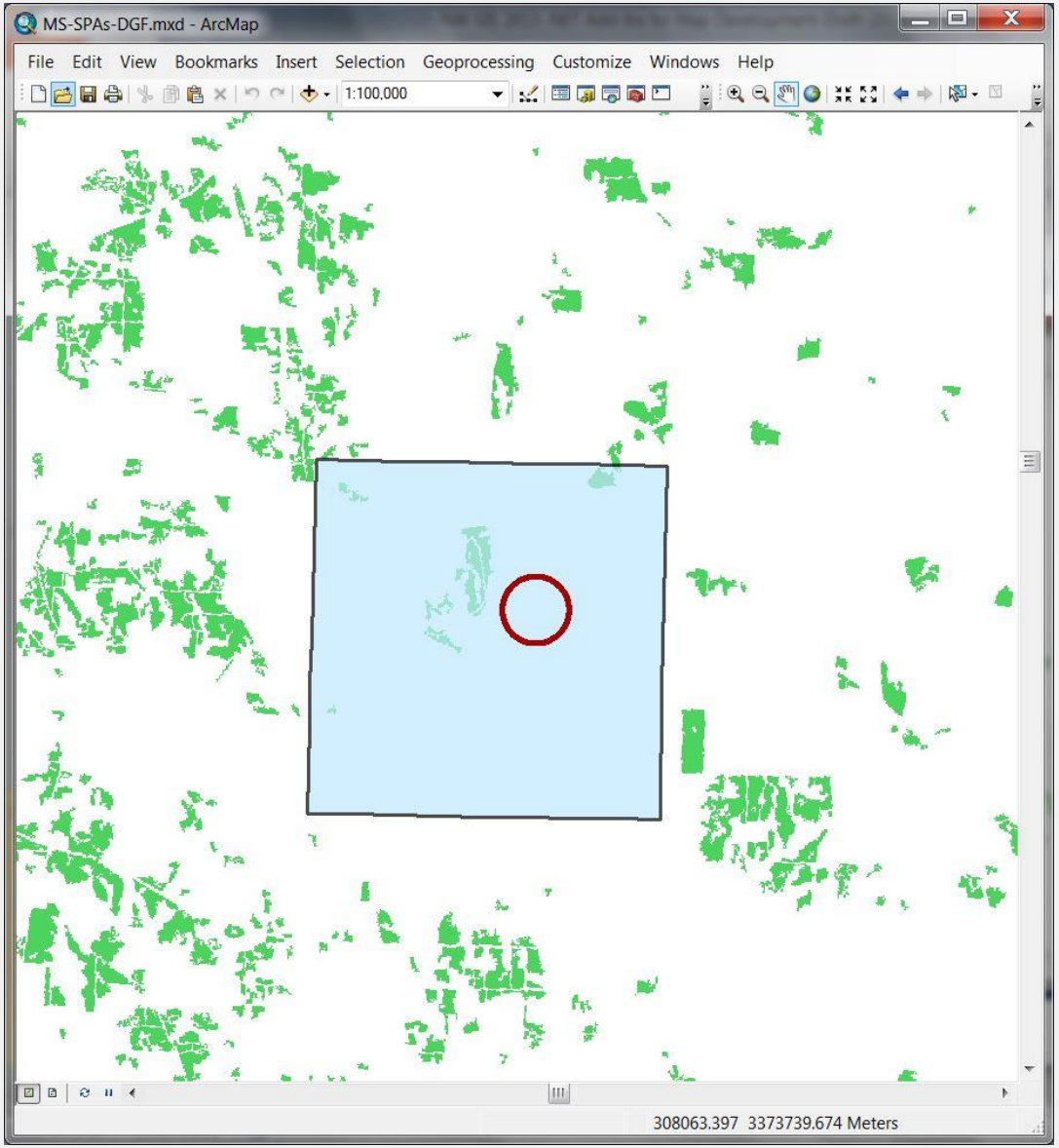


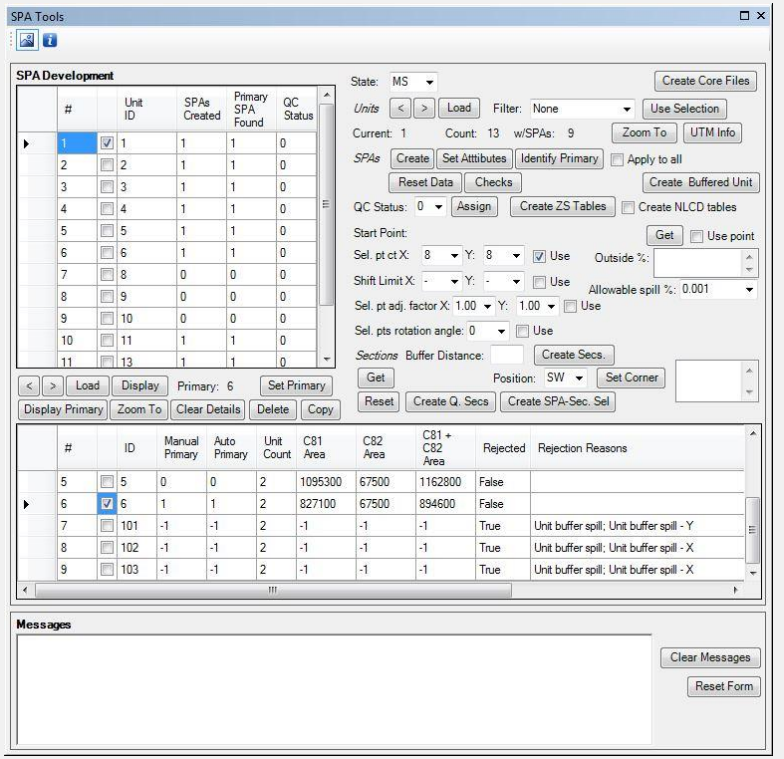


- Open Source
  - Similar approaches available
  - More command-line focused, lends itself to logging actions/commands
  - Others?

Images: http://watergis.files.wordpress.com/2012/03/modelbuilder.jpg?w=300&h=208

Species Protection Area Tools

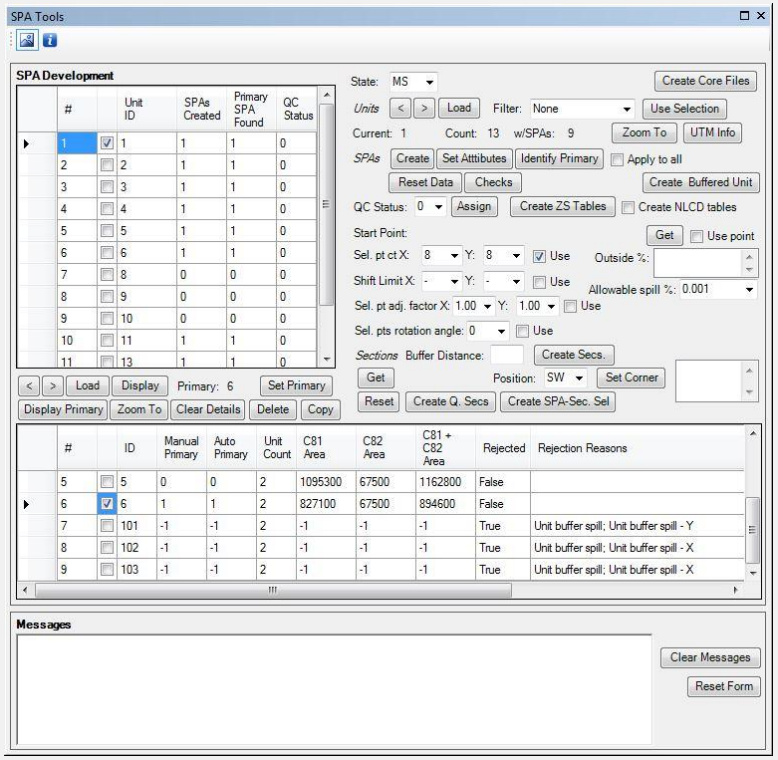




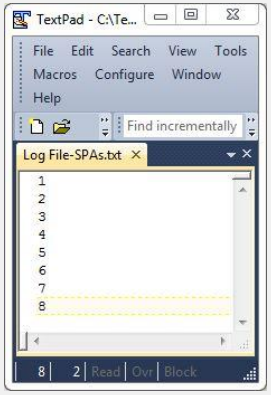
Goal: define protection areas for species habitat locations according to rules that vary from state to state. Example:

- U.S. Fish and Wildlife Service Critical Habitat (CH) locations for Dusky Gopher Frog in Mississippi
- Polygon of defined maximum size positioned such that
  - number of overlapping CH locations is maximized
  - area of agricultural land cover is minimized
- Polygons based on aggregation of selected quarter sections

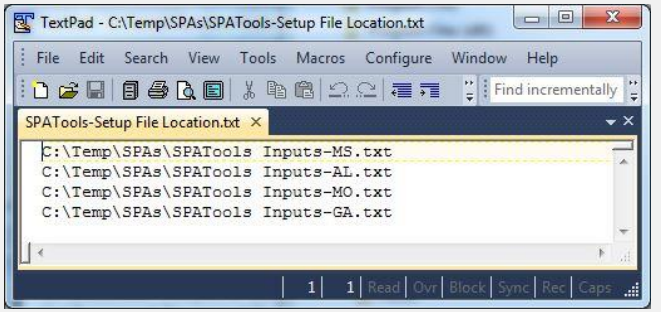
Species Protection Area Tools – Organization



Log file



Setup file location file



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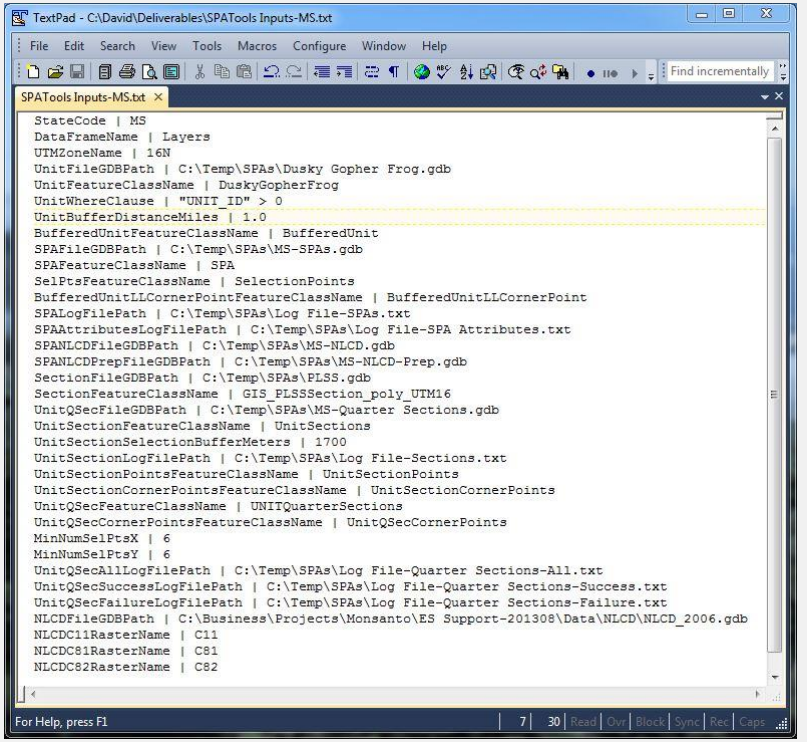

Deliverables

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Code	10/13/2013 2:17 PM	File folder	
MS-Quarter Sections.gdb	10/13/2013 2:25 PM	File folder	
MS-SPAs.gdb	10/13/2013 2:25 PM	File folder	
MS-SPAs-DGF.mxd	10/13/2013 1:18 PM	ArcGIS ArcMap Document	2,439 KB
SPAs-MS-DGF-20131013-1420.zip	10/13/2013 2:20 PM	Compressed (zipped) Folder	1,078 KB
SPATools Inputs-MS.txt	10/13/2013 2:11 PM	TXT File	2 KB
SPATools-20131013-1415.esriaddin	10/13/2013 1:18 PM	Esri AddIn File	265 KB

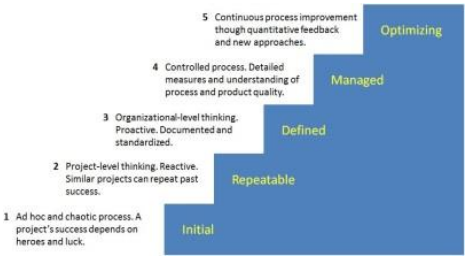
Conclusions

- Incorporating documentation and assessing/measuring quality need to not be onerous

- Aim to realize strong positive benefits

  Much better motivator than the threat of a lawsuit or other similarly frightening prospect

- Consider quality with reference to
  - Capability maturity model



  - Information lifecycle

  - McGilvray's Data Dimensions