Geog 464 Learning Objective Outline

LOO 15 Improvement Program Case Studies
15.1 What constitutes a workflow task model for improvement programming-level analysis for housing? Where might GIS be of use in the workflow?
15.2 What constitutes a workflow task model for improvement programming-level analysis for transportation? Where might GIS be of use in the workflow?
15.3 What constitutes a workflow task model for improvement programming-level analysis for a water systems (both supply and drainage)? Where might GIS be of use in the workflow?
15.4 What constitutes a workflow task model for improvement programming-level analysis for ecosystem services? Where might GIS be of use in the workflow?

15.1 What constitutes a workflow task model for improvement programming-level analysis for housing? Where might GIS be of use in the workflow?
RUGIS Chapter 10 Section 10.3.1

Land use programming issues touch on social, economic and environmental conditions across the community. Many urban problems stem from the social, economic and environmental processes intermingling and thereby creating external impacts among the conditions. As a result, there are many different perspectives on growth conditions, whether this be increase or decrease as a growth problem.

We look at affordable housing as one of the social goals in growth management, but very much a part of land use development. State, local, and public/private housing programs picked up the ball from Fed.'s who have made cuts. Local public/private partnerships are very much alive, using a variety of funding sources, mostly low-income housing tax credits

3 types of affordable housing programs in a growth management context (all popular in King County):
a) inclusionary housing programs – developers required to incorporate affordable housing units in proposed residential development
b) linkage – developers of nonresidential buildings required to include some component of residential units in development. The latter idea is the basis of an urban village concept (in central Puget Sound).
c) streamlining regulations – clarify language of ordinances, coordinate procedures, remove unnecessary duplication

What is Washington State doing about affordable housing? Let us consider this in terms of the potential for GIS workflow by looking at the activities of the Washington State Housing Finance Commission (http://www.wshfc.org/). The commission is:
>   - a quasi-governmental organization to foster affordable housing,
>   - a publicly-accountable, self-supporting team dedicated to increasing housing access and affordability,
>   - expands the availability of quality community services for the people of Washington, and
>   - fosters economic development
>   - all at no cost to the citizens of Washington State.

- The WSHFC is responsible for an affordable housing tax credit program in WA State. Changes year to year, but generally provides various opportunities across the state as needed for 9% tax credit

- Low-Income, Affordable Multi-Family Housing Tax Credit Program Application
>   Specific application program some geographic areas are favored over others

- Low-Income, Affordable Housing Tax Credit Program Qualified Allocation Plan
       Selection criteria for various applications – see web site Section A
- Qualified census tracts in Washington State – see web site Section I
- Programs other than multi-family housing – at top in pull down

15.2 What constitutes a workflow task model for improvement programming-level analysis for transportation? Where might GIS be of use in the workflow?
RUGIS Chapter 10 Section 10.3.2

A Case Study 1999 PSRC TIP process was undertaken to identify where and when GIS was being used.   Many people (groups) are involved in the process. To demonstrate that potential we use the same task/subtask ordering as in Table 10.1, but describe where and how GIS could be used (see Table 10.3). Only subtask 1.2 cannot make use of GIS maps in some way, as that task is a "voting/approval" action and there is no spatial aspect to the agenda process. All other tasks/subtasks have a potential application of GIS. The main point here once again is that decision situation information need drives the nature of GIS workflow. Know your information need!

Table 10.3 Potential Contribution of GIS to Transportation Improvement Programming

Task/Subtask	Decision Function(s)
Task 1.1 Create TIP Policy Framework	Discussion of the potential needs for improvement; characterize the deficiencies in transportation system.
Task 1.2 Adopt TIP Policy Framework	Not a spatially-enabled task.
Task 1.3 Approve Funding Allocations	GIS maps depicting a regional funding distribution by City and County
Task 2.1 Create and Approve Regional Evaluation Process	Maps of the objectives to be addressed relative to the existing transportation system conditions. Map the public concerns.
Task 2.2 Project Option Generation	Collect project proposals and geo-reference them to the network.
Task 2.3 Score Projects	Apply the objectives of 2.1 to the projects of 2.2, map the results
Task 2.4 Initial Evaluation	Using multi-criteria evaluation techniques create a ranking of improvement projects. Perform trade-off analysis, exploring various value structures toward prioritizing projects.
Task 3 Review and Recommend Draft Regional Priorities	Spatially review projects on maps, with the broader community. Public participation GIS displays.
Task 4.1 Conformity Analysis	Air quality modeling results depicted in GIS maps.
Task 4.2 Assemble Draft TIP	Bring various scenarios to light, and demonstrate how the preferred is better, considering the spatial characteristics of

	the transportation system.
Task 5 Public Review and Comment on Draft TIP	Post the maps for review by the public, and collect spatial relevant comments.
Task 6 TPB Recommends TIP Action	TPB puts forward the TIP as a spatially-enabled TIP.
Task 7 Executive Board Takes Final Action choice	PSRC Executive Board takes a final action as presented in the maps.

The process involves a large number of professional groups and the public. This implies that the process might be improved if participatory GIS technology could is used. For example, see the participatory GIS for transportation experiment at http://www.letsimprovetransportation.org.

15.3 What constitutes a workflow task model for improvement programming-level analysis of water systems (both supply and drainage)? Where might GIS be of use in the workflow?
RUGIS Chapter 10 Section 10.3.3.1

Capital improvement program Categories and Projects as part of the Seattle Public Utilities (SPU) Comprehensive Facilities Plan (CFP) The proposed CIP and projected CFP have in the past been organized broadly into five categories.
1) Water Infrastructure   3) Water Supply and Conservation   5) Technology
2) Water Quality   4) Other Agency Projects

Improving a water system plan is a matter of connecting short-term capital improvement program to long-term capital facilities plan. The SPU web site provides a section by section presentation of the plan. The most recent water system plan is presented here. The most recent capital improvement program is presented here.

Thematic Priorities
The overarching goal of the Water CIP is to ensure that the water system is properly maintained, upgraded, and expanded to reliably deliver high-quality, safe drinking water to customers, protect the environment, and comply with regulations. The primary themes driving the CIP in the next six years are asset preservation, health and human safety, environmental sustainability, and race and social justice.

- SPU is committed to making **asset preservation** investments to create or enhance operational efficiency. SPU uses asset management principles to determine the timing of rehabilitation or replacement of its infrastructure. Projects that fall into this category vary, ranging from water main replacement related to transportation projects to decommissioning of steel storage facilities.

- SPU's commitment to **health and human safety** is also addressed through SPU's reservoir covering projects. Consistent with Ordinance 120899 and required by state regulators, SPU has been replacing its open finished drinking water reservoirs with underground structures that will improve water quality and system security. Seismic retrofits are planned for four of the buried reservoirs that have design flaws. SPU plans to decommission Roosevelt Reservoir and Volunteer Reservoir are evaluation of system.

- SPU is committed to **environmental sustainability.** This can best be seen in SPU's responsibilities as outlined in the 50-year Habitat Conservation Plan (HCP), an agreement between local, state and federal agencies. The HCP seeks to ensure the long-term ecological integrity of the Cedar River Watershed, which supplies the majority of the City's drinking water. It simultaneously addresses the needs of protected wildlife species in and along the Cedar River. Investments in the regional conservation and low-income conservation programs also help in management of our natural resources, while helping customers reduce their utility bills.

- SPU is also committed to **race and social justice**. One example of this commitment is the Low Income Water Conservation Program. This ongoing program provides water use efficiency resources to the City's low-income customers to implement water conservation measures. Typical improvements consist of, but are not limited to, installing water-efficient fixtures, such as aerating showerheads and faucets, low water-use toilets and efficient clothes washers. The program is cooperatively managed by SPU and the City's Human Services Department.

Project Selection Criteria

SPU identifies candidate capital projects from several sources – planning (e.g. comprehensive plans, program plans), external projects and opportunities, and emergencies or other unexpected events. Under SPU's Asset Management system, projects must be justified through a business case process that establishes that a problem or opportunity is timely and important, and that the proposed solution is superior to alternatives based on a triple bottom line analysis (economic, environmental and social) of life cycle costs and benefits. The process also recognizes that a project may be a "must do" project (e.g. required by regulation). SPU prioritizes its capital projects into three categories – Priorities 1, 2 and 3, with 1 being the most important and critical. Some projects are part of an externally driven project. Typically, SPU lacks control over the timing of externally driven projects. Priority rankings are based on the following set of criteria:

- **Regulatory Mandates, Legal Agreements:** The degree to which a project is driven by federal, state, and local laws, permit and regulatory requirements, and consent decrees; as well as by legal agreements with public and private parties. Examples of highly ranked projects in this category include the reservoir covering programs and the Habitat Conservation Program.

- **External Drivers:** SPU's responsiveness to, or engagement with, projects of other Departments or Jurisdictions, and the specific mandates of the City Council and Mayor. Examples of highly ranked projects in this category include the Alaskan Way Viaduct and Mercer Corridor projects.

- **Infrastructure:** How a project addresses infrastructure conditions or vulnerabilities. Examples of highly ranked projects in this category include the Waterman Rehabilitation, Distribution System Improvements and Tank Improvements programs.

- **Level of Service:** The importance of a project in providing or improving services to customers. Examples of highly ranked projects in this category include the Water Infrastructure – New Taps and Service Renewals programs.

- **Other Factors:** Other important factors include high net present value or cost-effectiveness, social or environmental benefits not otherwise captured, a project already in progress or near completion, limited time opportunity, demonstration projects, community visibility, outside funding. An example of a highly ranked project in this category includes Rattlesnake Lake Sanitary Facilities.

Every project is rated against each criterion. Criteria ratings are then considered in determining an overall project priority ranking, using expert judgment (rather than a formula). Priority rankings for the CIP are determined by the leads for each Line of Business (LOB), with review by key internal stakeholders. The ranking scheme and criteria are the same for all LOBs and are approved by the SPU Director and Asset Management Committee. Project priority rankings are used to clarify and document which projects are most important (and why), to help determine which projects at the margin will be

included or excluded (or deferred) from the CIP, and which projects should receive priority attention if a staff or financial resource constraint should arise.

15.4 What constitutes a workflow task model for improvement programming-level analysis for ecosystem services? Where might GIS be of use in the workflow?

A salmon habitat plan for WRIA9 has been under development ever since shortly after the US Endangered Species Act (ESA) was invoked in the central Puget Sound region in 1999. Six species of salmon were listed for protection under ESA. Many habitat areas (so-called green infrastructure projects) have been identified that are in need of investment for restoring and improving the WRIA9 salmon health in particular and Puget Sound water quality more generally.

Ecosystem services are functions provided by natural capital e.g. ecosystems that offer value such as a home for fish or where people can swim without being harmed. Identifying value of Puget Sound ecosystem services resources is critical to improving well-being on a consistent basis. It possible that ecosystem services value in Puget Sound could be worth between \$9 - \$83 billion every year. Identifying value of service is important to maintaining investment in the service infrastructure.

Remember that a stable revenue stream is one of the most significant characteristics for implementing an improvement program.   In 2009, a Watershed Ecosystem Forum associated with salmon habitat restoration has been exploring funding mechanisms for development of a watershed investment district (WID) for water resource inventory area 9 - WRIA9 in Washington State. This is perhaps the first of many such WIDs that would provide a stable stream of revenue for improving natural capital (in the form of habitat) that supports provision of ecosystem services in watersheds across Puget Sound.

A rationale for watershed taxing is critical part of justifying the importance of investment in ecosystems infrastructure. Proposed Washington State legislation for watershed investment districts was drafted July 20, 2011. In the legislation, "**Sec. 306 Revenue Sources**
Authorizes a district board to fix or impose a fee, tax, surcharge or assessment as approved by a majority of voters within the district and lists a menu of options, including general property tax; utility fee; sales and use tax; real estate excise tax; per parcel assessment; and pollution discharge tax." A two-page summary of the legislation can be found at here.