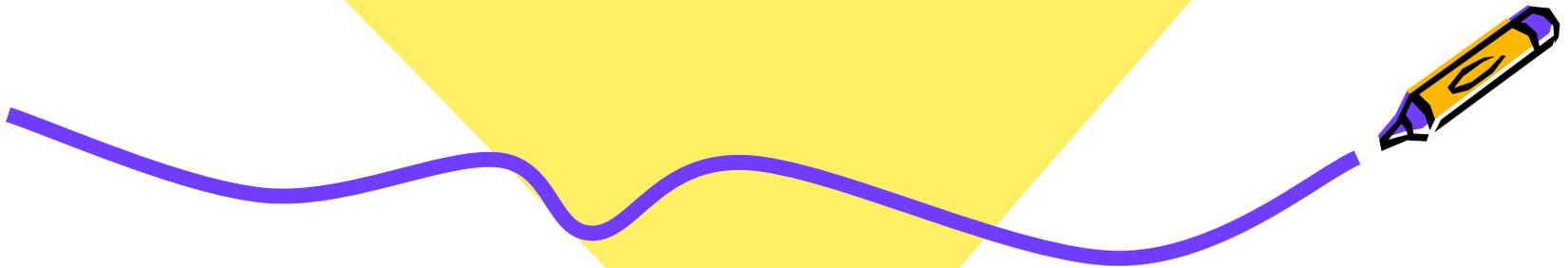


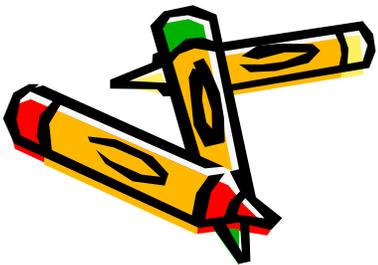
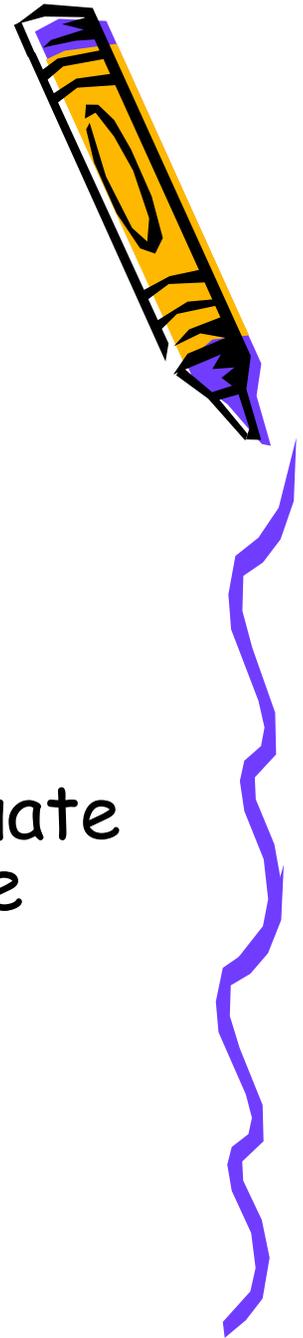
Allocating Scarce Water

John Freebairn



Context, Ideals, and Current Situation

- Water is scarce with competing uses
 - Households
 - Industry
 - Irrigation
 - Environment
- Allocate water to different uses to equate marginal social benefits across each use
- Current allocation of water is far from efficient



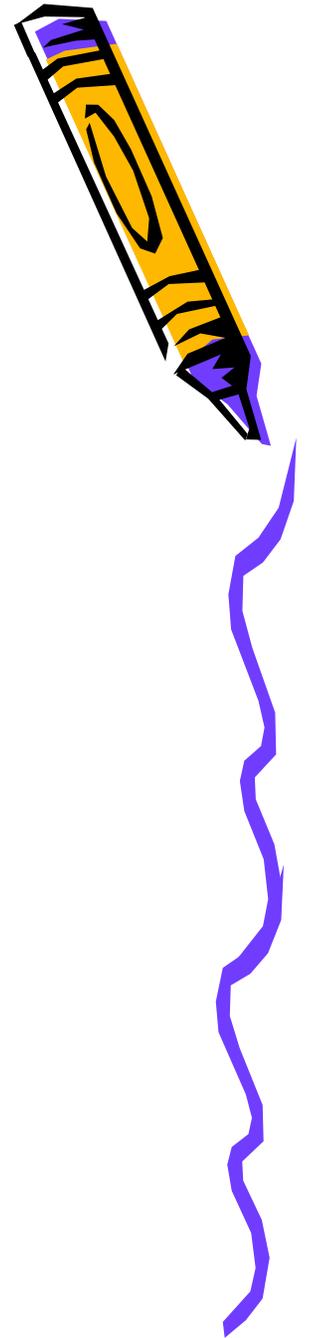
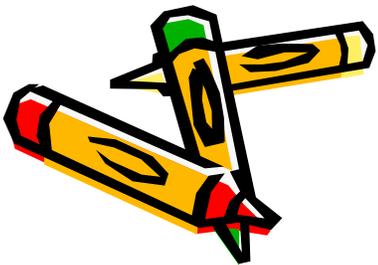
Water Characteristics and Uses

- Mostly private goods
 - Households
 - Industry
 - Irrigation

Here markets and water prices allocate efficiently

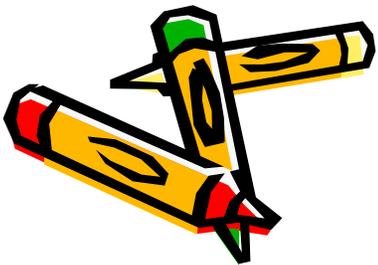
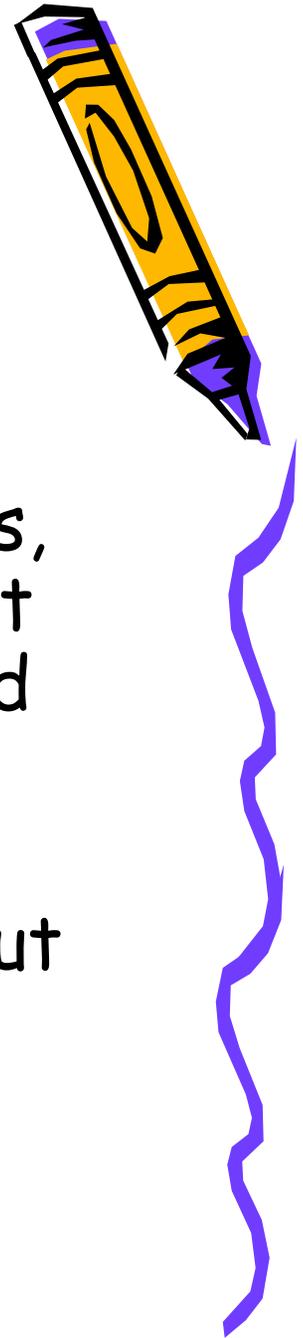
- Mostly public goods
 - Native flora and fauna
 - Heritage

Here markets fail



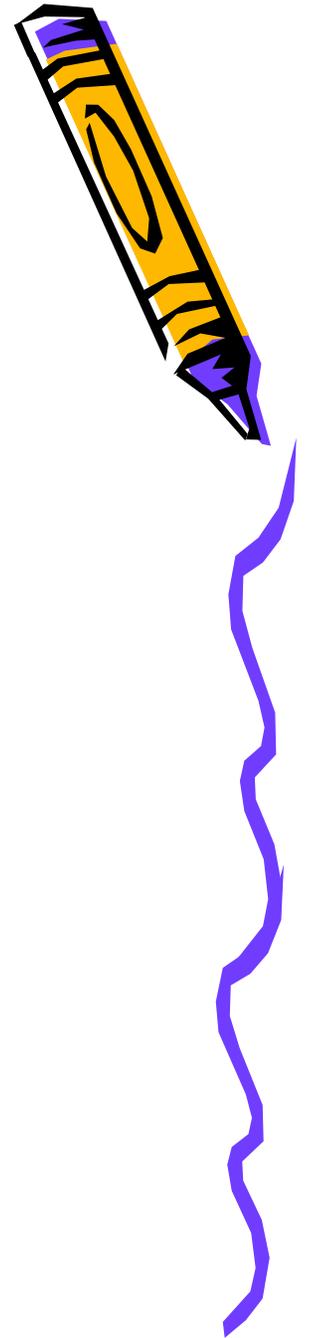
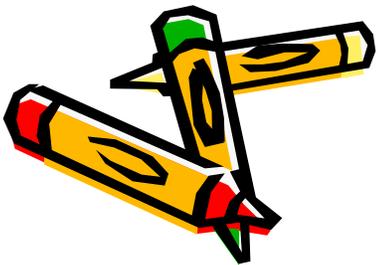
Institutional and Policy Progress

- Separation of land and water rights
- Markets for temporary water transfers, but excessive restrictions on permanent transfers, transfers across regions, and transfers across user groups
- Recognition of need for government intervention for environmental flows, but rules of intervention still rudimentary



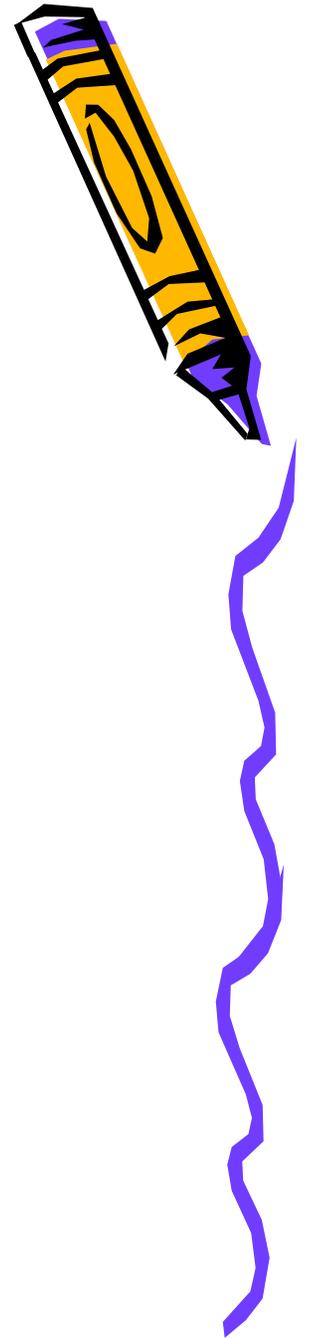
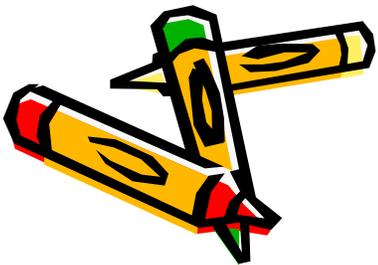
Water Markets: Some Design Issues

- Water property rights
 - Variability of water supply
 - Grandfather allocation
 - Upstream and downstream
- Water use licences
 - Waste disposal
 - Irrigation external costs
 - Distribution costs and restrictions



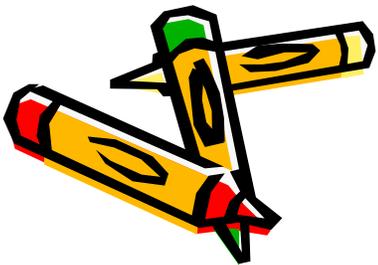
Water Markets: Operation

- Mutually beneficial trades
 - Flows
 - Stocks
- Reallocation to more valuable uses
 - Static
 - Response to changing circumstances
- Incentives to improve efficiency
- Framework for future technological development



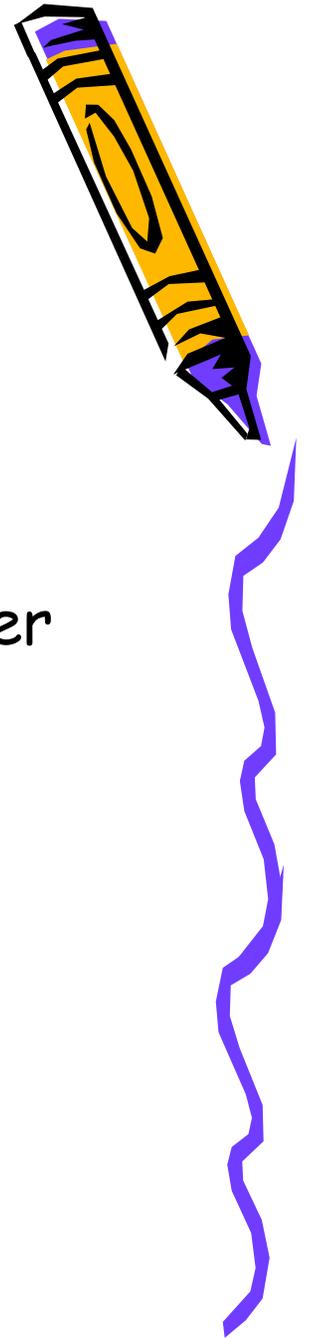
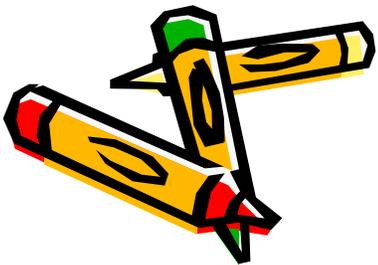
Environmental Flows: Framework

- A means to provide valued services
- Subject to declining marginal benefits
- Ideally want to equate marginal benefits with the market water price
- Requires data on:
 - The effects of different flows on changes in flora and fauna
 - Estimates of the value to society of marginal changes in the supply of flora and fauna



Environmental Flows: Practice

- Options on how to acquire more water:
 - Purchase water rights
 - Regulate to reduce water available per water right
 - Supply expansion
- Changes over time in allocation:
 - Rising incomes
 - More knowledge



Conclusions

- Choices to allocate limited water among different uses. Equate marginal social benefits.
- Water markets with well defined property rights fine for most household, industry and irrigation uses.
- Government intervention for many environmental services. Data on extra biodiversity, and society valuations

