

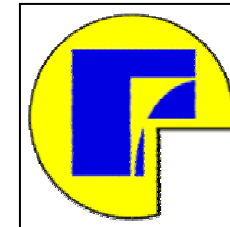
Empty Intermodal Container Management



Maria Boilé, Ph.D.



2005 NJDOT Research Showcase
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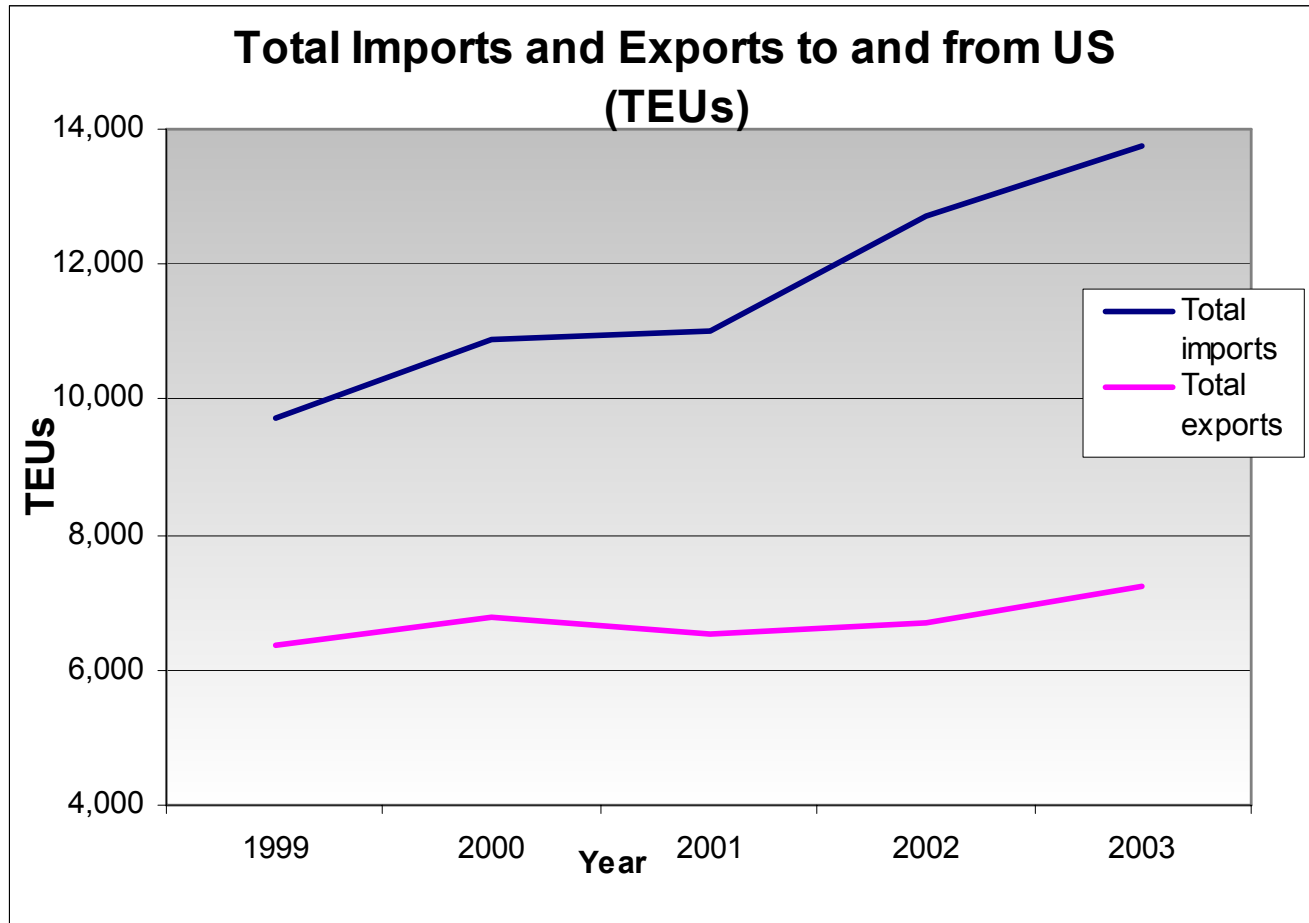
Outline

- Problem Context
 - External Environment and the Regional Context
 - Major players and their interactions
 - Patterns of empty container movements
 - Issues in Tackling the Problem at a Regional Level
 - A Decision Support Tool
 - A Strategic Decision Perspective Applied to New Jersey
 - Conclusions
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Problem Context

- Global container population in million TEUs: (2001), 18.8 (2004), 21 (2005 est.), 23.2 (2006 est.)
 - \$110 billion per year spent to manage shipments globally, 15% (\$16.8 billion) associated with inefficiencies in container operations (including empty containers 'idle time')
 - Empty containers accounted for 20% of the ocean container movements at a cost of \$3.5 billion a year (Drewry Shipping Consultants, early 1990's)
 - In 2003 the percentage was about the same but the cost escalated to more than \$11 billion (not counting overland repositioning and 'idle' cost)
 - In 1997, 8.7 million loaded containers were imported in the US and 6.4 were exported. Since then the difference has increased.
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Problem Context



Problem Context

- In the past, it has been cheaper for freight companies to buy new containers overseas than to ship empties back.
 - In 2004 there was an unpredicted hike in steel prices. Price of a new 20ft dry box went up from about \$1,400 to over \$2,000. Lease rates also soared by about 50%.
 - Shipping lines began repositioning empty containers spending about \$1,000 for each container.
 - A survey of more than 600 depots in North America shows a decline of empty box supply by 41% over a three month period in early 2005.
 - Steel prices dropped, carriers' share of container ownership increases, trade volumes increase, vessel capacity increases.
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External Environment and Regional Context – Major Players

- Carriers, including global and niche carriers
 - Container leasing companies
 - Depot enterprises (handle, store and repair empty containers and may own a small share of them)
 - Major shippers (may own a small amount of containers for their dedicated use)
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Major players and their interactions

Structural changes in shipping liners world

- Carriers integrating their resources, forming alliances and groups, mergers and acquisitions, cooperation agreements regarding slot exchange and ocean carrier consortia and joint services
 - Carriers are getting involved in horizontal and vertical integrations with the other organizations in port operations, freight forwarding, logistics services and inland transportation
 - Carrier firms charter each other's capacity (slot chartering), which results in more container movements and fewer ship miles
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Major players and their interactions

The container leasing business

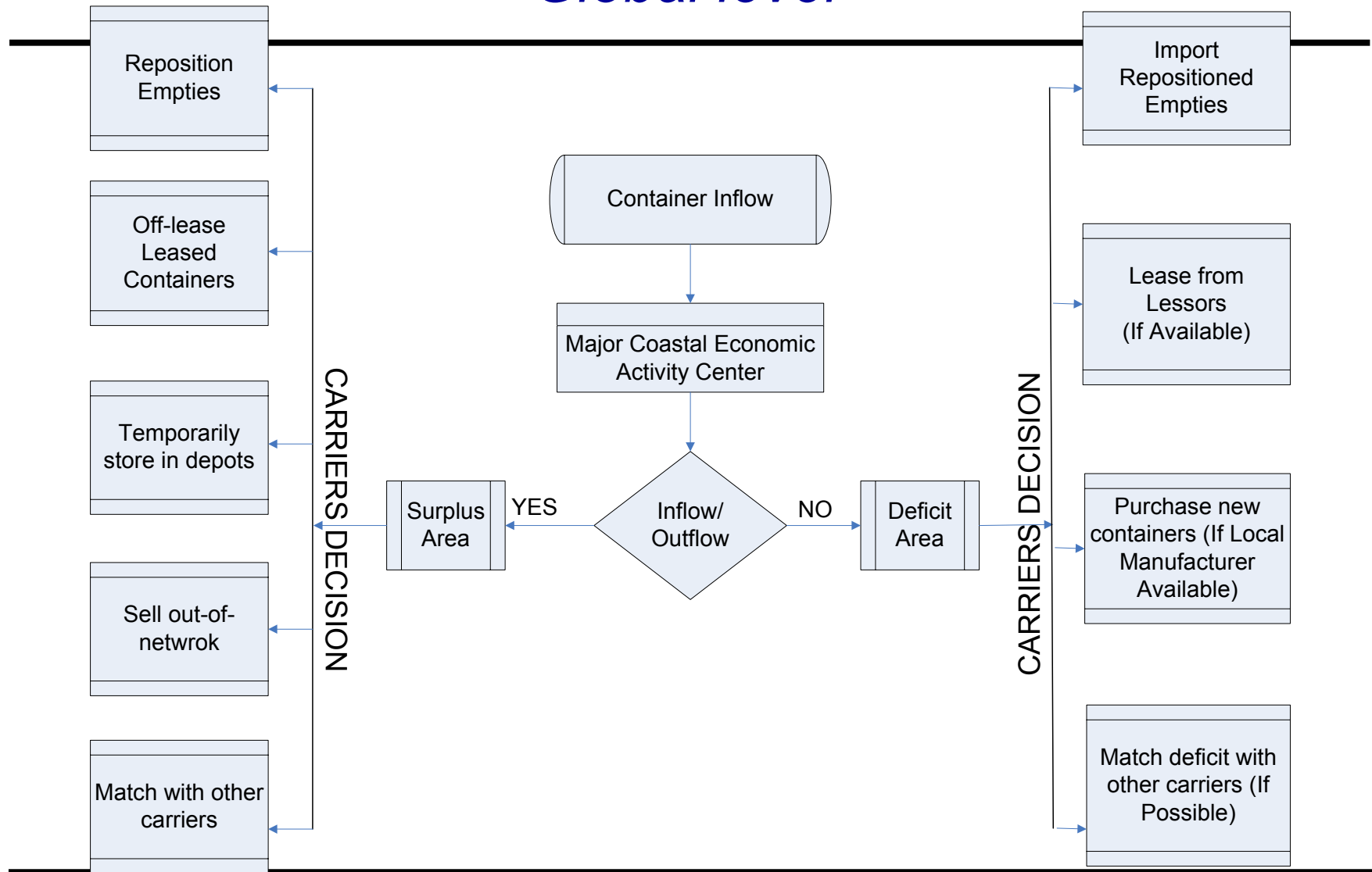
- Economic benefit and flexibility to carriers, especially in periods of high demand for containers
 - Large container leasing companies capitalize on the convenience of their worldwide facilities and container availability
 - Smaller companies capitalize in areas where they can provide closer personal service to selected customers
 - Lessors owned about 47.5% of the total TEUs in 1999, a share that was reduced to just over 43% in 2002.
 - Currently there is tendency for major carriers to enter the box manufacturing
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Major players and their interactions

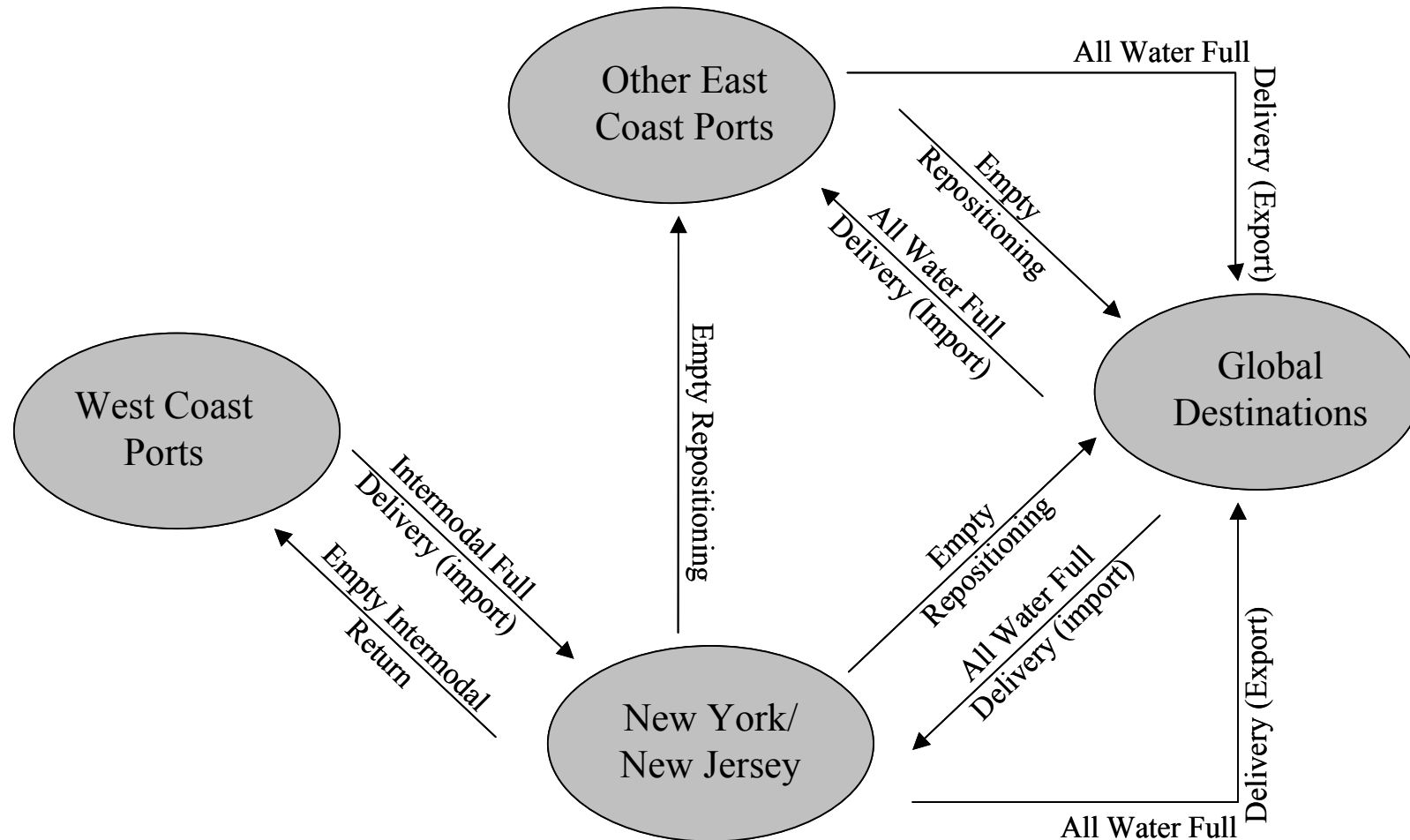
- Carriers handle containers as transportation equipment, while leasing companies consider them as assets, seeking to cover depreciation and make profit out of their leasing.
 - When ocean carriers have been faced with strengthening demand, rising container prices, lengthening delivery lead times and shortfalls in immediately available stocks they tended to lease in greater amounts and take the cost of moving containers from surplus to demand areas at their own expense.
 - Long term leases have significant impact on the throughput volume in depots as lower gate volumes from leasing companies mean lower repair revenues to depots.
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Patterns of empty container movements

Global level



Patterns of empty container movements Regional level



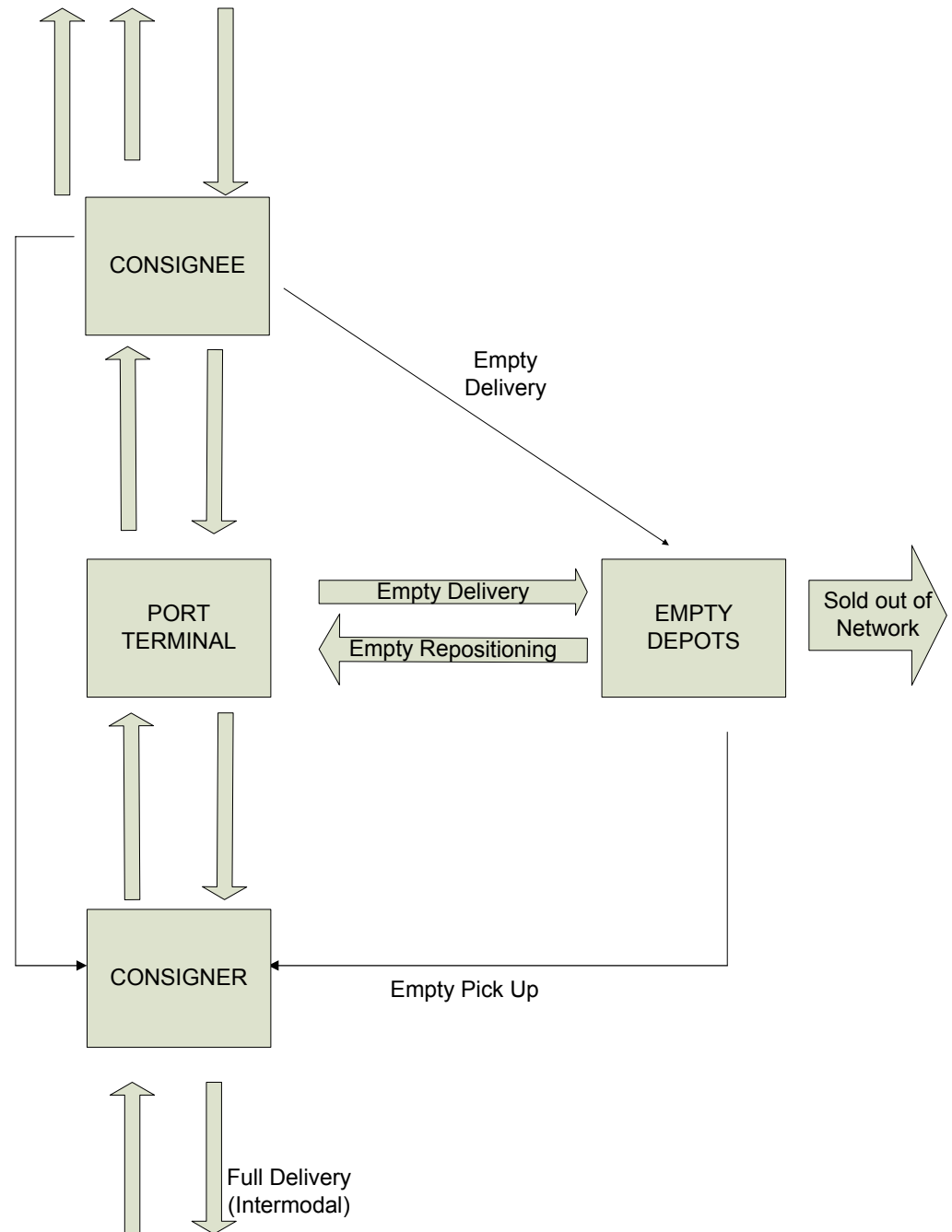
Notes:

Empty repositioning to other east coast ports almost exclusively all water.

Empty Intermodal return to US west coast ports almost insignificant.

Patterns of empty container movements

Local level



External Environment and Regional Context

- Empty containers stored in depots fall within the following categories:
 - Those that are within the transportation network, temporarily stored, waiting to be filled and exported or to be repositioned back to demand areas.
 - Those that are long term stored, waiting to be sold in the secondary market, aged (more than ten years) and effectively out of the transportation network.

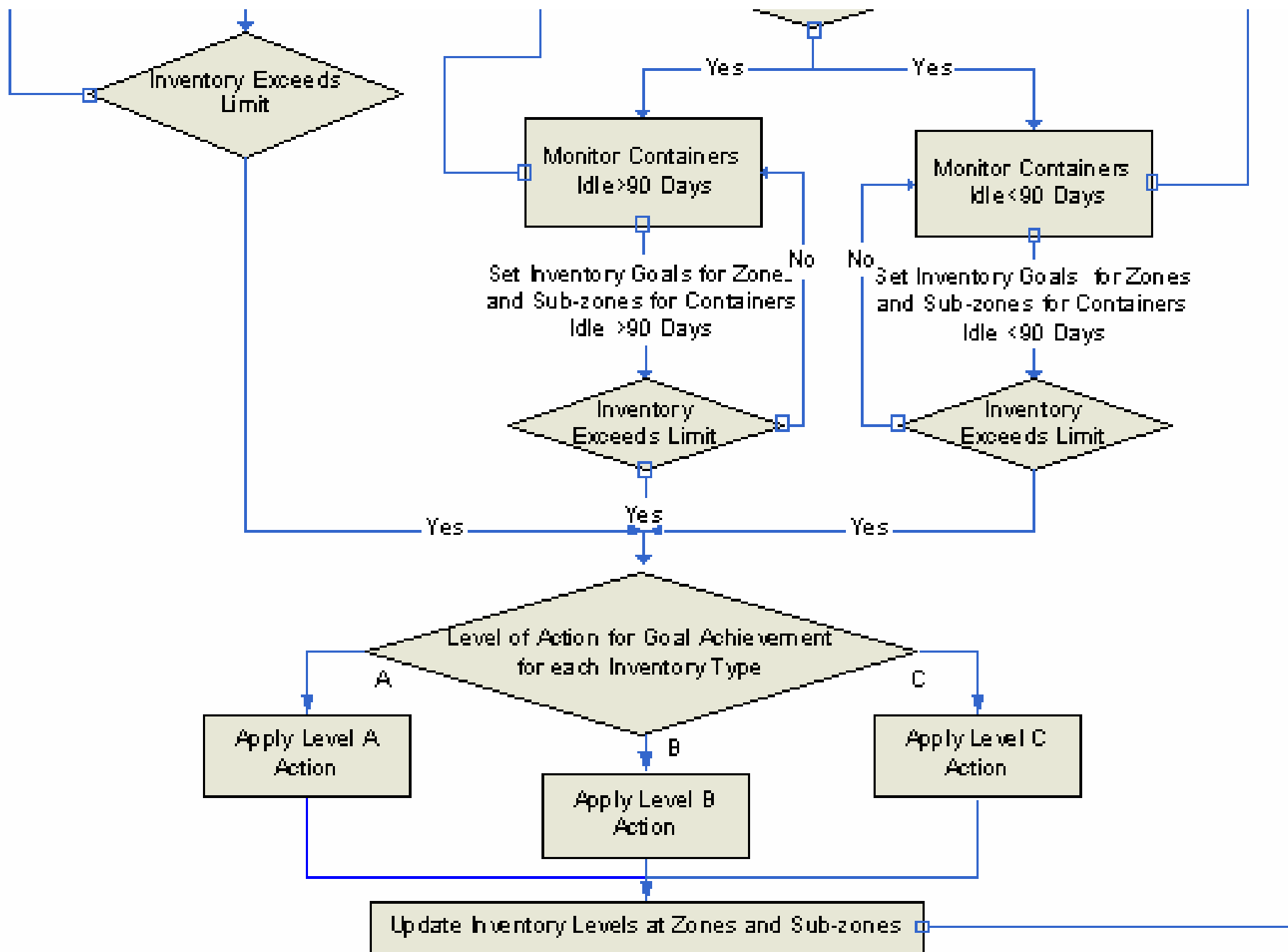
 - The two categories of empty containers mentioned above require different approaches:
 - Those in the network require an industry based initiative to increase matching possibilities and decrease empty trips.
 - Those out of the network require periodically reviewed measures to increase the possibility of removing to secondary market or to scrap.
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Issues in Tackling the Problem at a Regional Level

- Empty container logistics is a global issue, influenced by international transportation practices, governed by global trade patterns and mostly dictated by major ocean carriers' interests.
 - Complete and direct control of empty container accumulation at a regional level falls beyond the ability of local and regional authorities.
 - Institutional, fiscal or regulatory measures can be proved inefficient in lessening the accumulation problem and even detrimental to the competitive position of transportation resources of the region in the international marketplace if the global environment is not considered in formulating them.
 - Both the external environment and the structure of the transportation industry in the region should be taken into account
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Issues in Tackling the Problem at a Regional Level

- All policies should be taken bearing in mind the very dynamic nature of the maritime transportation industry.
 - Authorities involved in formulating and implementing these policies should ensure thorough understanding of the global container logistics and precise monitoring of container accumulation in the region.
 - In applying measures, short, medium and long term interventions and expected results should be considered.
 - A stepwise and scale responsive approach is required.
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Measures

- **Level A** (Short Term) May also be called “Operational”, although not all of them are operational
 - **Level B** (Medium Term) may also be called “Tactical”
 - **Level C** (Long Term) may also be called “Strategic”
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Level A: Short Term Measures

- Equipment matching opportunities (Assisted by a VCY)
 - Tax write-off for income gained from selling old containers
 - Taxation for aged containers (Scale up with idle time)
 - Change in demurrage charges (Scale up with idle time scaling)
 - Free-time period
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Level B: Medium Term Measures

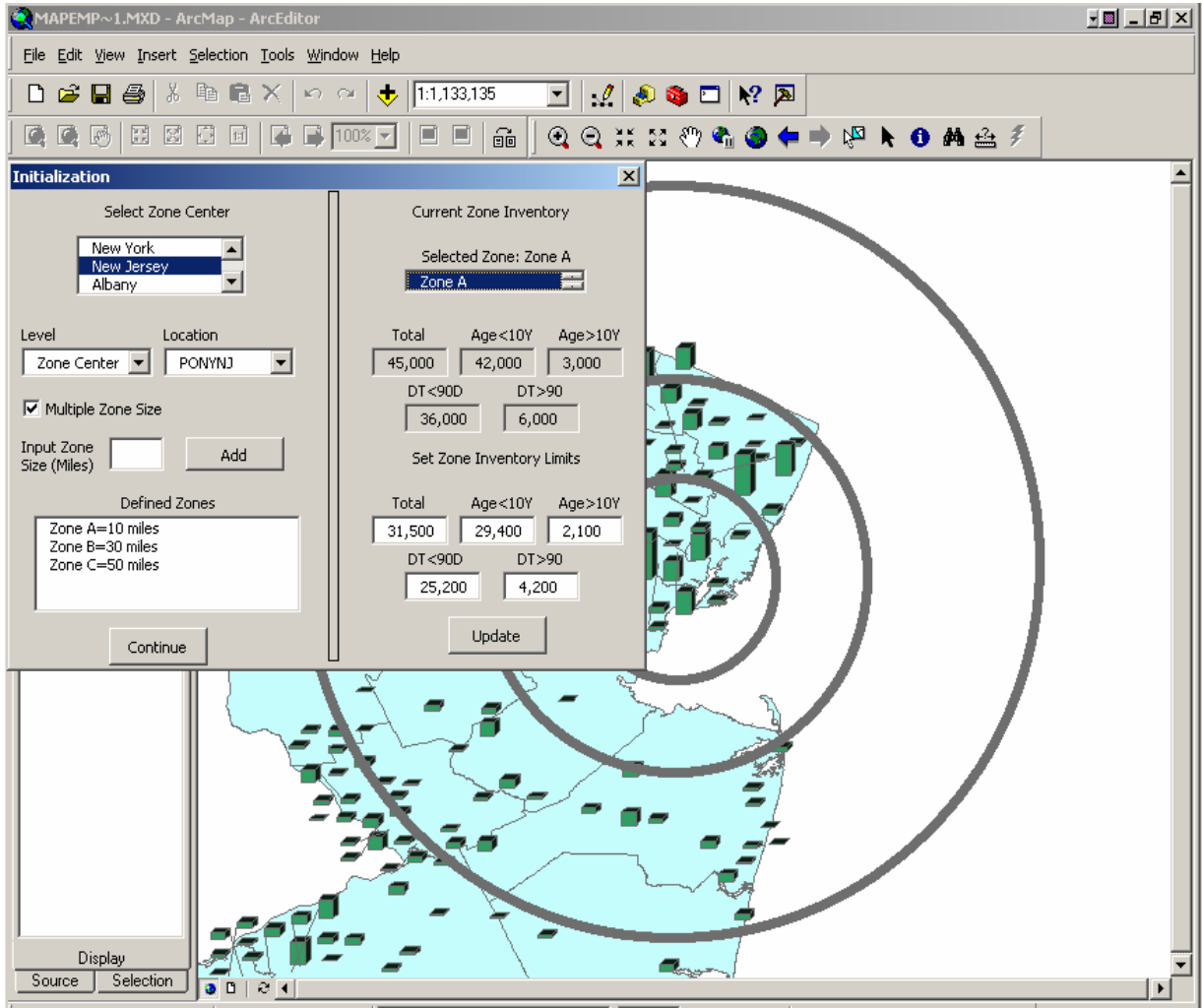
- Capacity constraints - eg. Limit height to stack of three containers in height like Chicago, or limit to a maximum of x containers per depot and y containers per sub-region (concurrently)
 - Tax write off incentives - limit depreciation period from 15 to 10 years, so that the exempted from taxation annual depreciation to be raised accordingly, but with the obligation to sell boxes after ten years of economic life to secondary market.
 - General Taxation - for containers being idle for x period of time in a depot or in a sub-region (irrespective of the retention time in a specific depot in the region)
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Level C: Long Term Measures

- Develop new zoning rules so as to raise disincentives or even eliminate the possibility of locating or operating depots (including measures to discourage location of additional depots in a certain sub-region).
 - Relaxation of brownfield land use impediments – investigate the possibility of alternative uses which will raise land value and will make it not economically beneficial to have a depot.
 - Incentives to develop more profitable land uses, a measure which will result in the indirect effect of raising land value at levels where empty container storage fees cannot be afforded. In particular, incentives in locating distribution facilities, such as transportation infrastructure favorable in attracting such facilities (ex. dedicated corridors or priority truck lanes) can be very effective.
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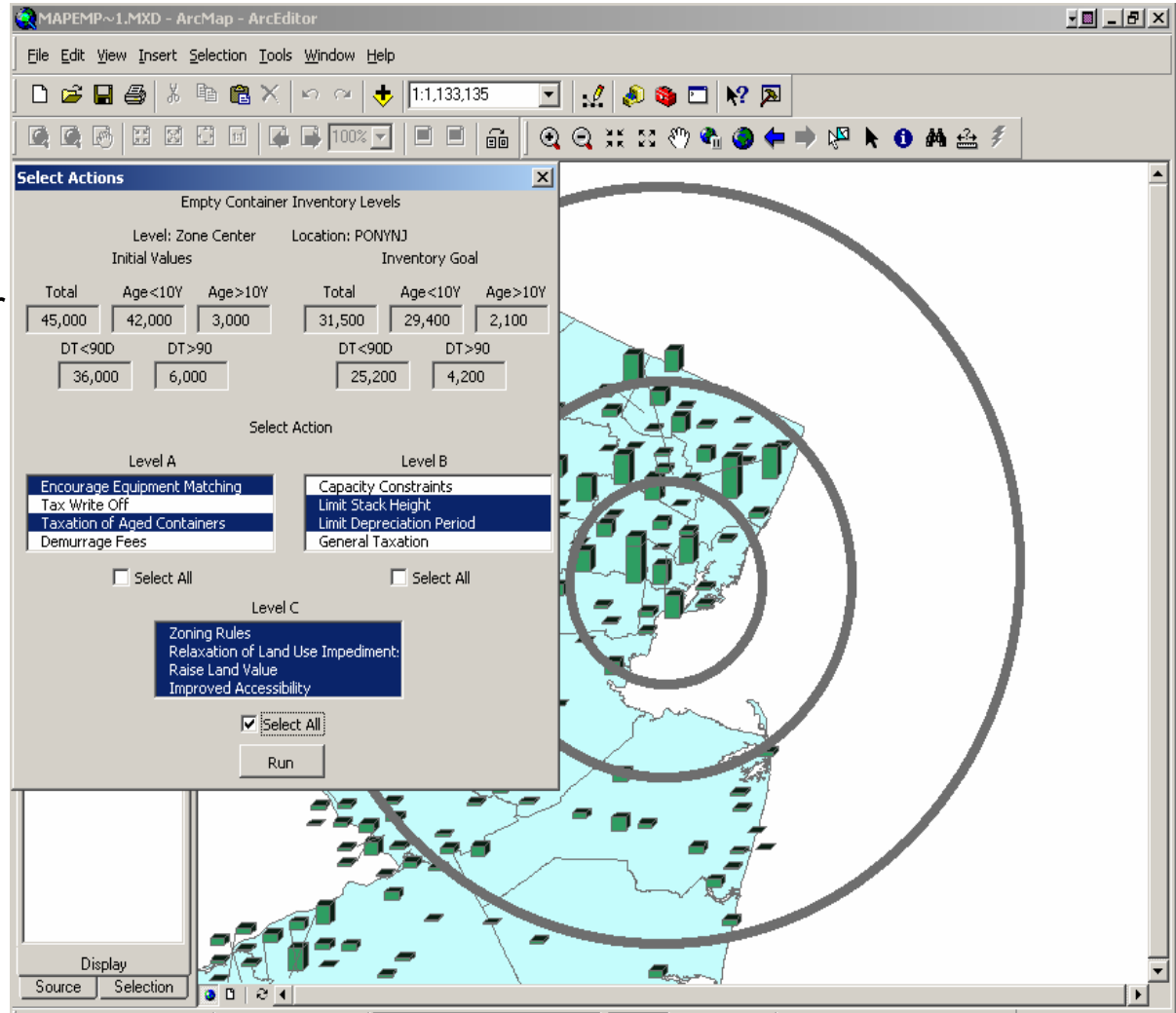
A Strategic Decision Perspective Applied to New Jersey

- Determine the facility or zone(s) and sub-zone(s) to be analysed
- An individual facility, county, zip code or an area within a certain radius from a particular location may be selected
- Select the zone to be analysed first
- Set the desired inventory limits for each inventory group within this zone
- Initiate procedure to evaluate alternatives



A Strategic Decision Perspective Applied to New Jersey

- A list of possible actions is available
- Three levels (described previously)
- Ability to select all or a number of the actions available
- Dynamic tool for what-if scenario analysis (test exclusion of actions that are deemed to be unacceptable for certain locations, periods of time or to individual stakeholders)
- Additional measures may be added depending on the policies to be adopted



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