

## **APPENDIX C**

### **TYPICAL RIVER ICE MANAGEMENT STUDY**

C-1. General. A River Ice Management Study is conducted for the purpose of developing a River Ice Management Plan for a particular river or river basin. Typically, the River Ice Management Study would identify several options and develop schedules of time and costs for each. Then the chosen option or combination of options would go into the recommended River Ice Management Plan, which would become an operating document at the District level. The typical River Ice Management Study would be composed of the following elements.

C-2. Elements.

a. Inventory of River Characteristics.

- River reaches delineated and evaluated.
- Major tributaries evaluated.
- Hydraulic and flood control structures identified  
(including features and operational characteristics).
- Hydraulic and hydrologic data.

b. Description of Ice Problems.

- Ice and winter histories.
- Winter navigation and traffic characteristics.
- Project operational techniques in winter (site-specific).
- Ice problem identification and description (site-specific).
- Current ice problem mitigation techniques.

c. Ice-Hydraulic-Meteorological Data.

- Existing data summarized  
(including stations, data types, collection, and processing).
- Data gaps identified.
- Recommendations for additional data collection (site-specific).
- Ice forecasting system  
(including capabilities, function, operation, and integration with existing hydraulic models).

d. Communications Systems.

- Existing ice information reporting systems.
- Recommendations for improvements  
(including content, frequency, availability, and dissemination of current ice information).

e. Possible Structural Solutions.

- Techniques available.

- Application of site-specific structural solutions.
- Determination if Environmental Impact Statement is needed.

f. Possible Operational Solutions.

- Techniques available.
- Application of site-specific operational solutions.

g. Recommended Functional River Ice Management Plan for Subject River or Basin.

- Data collection program.
- Development and integration of ice forecasting methodology.
- Recommended structural ice control measures.
- Recommended operational techniques.
- Operational guide.
- Ice emergency options  
(including decision “tree” or “matrix” for determining when to close the river to navigation because of extreme ice conditions).
- Implementation plan.
- Schedule of structural improvement costs and annual operating costs.
- Benefit-Cost Analysis for structural measures  
(done by District even if River Ice Management Study is conducted by non-District entities).