



WATER USE IN PULP, PAPER, & FOREST PRODUCTS

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MANUFACTURING USES

- Pulp
- Paperboard
- Linerboard
- Corrugating Medium
- Kraft Paper
- Fine Paper
- Newsprint
- Bleached Board
- LWC
- OSB
- Other



TYPES OF USES

- Stock dilution
- Bonding of fibers
- Showers
- Pulper dilution
- Hydraulic cooling
- Seal Water
- Cleaning
- Roll cooling
- Condensers
- Wash-up hoses
- Cooling towers
- Lubricating
- Boilers (steam)
- Chemical make-up



WATER TYPES

- Fresh Water
 - Surface water (river, lake, reservoir)
 - Well water
- Treated mill water
- Potable water
- Boiler feed water
- Cooling water
- Seal water
- Chemical make-up
- Warm water
- Hot water
- Chilled water
- Whitewater
- Filtrate
- Cleaning showers
- Wash-up hoses



WATER BALANCE

- Fresh water entering facility
- Water in raw materials used
- Water in effluent or other waste (sludge) leaving facility
- Evaporation
- Water leaving with the product



FRESH WATER REDUCTION

- Use process water where feasible
 - Need proper filtration
- Reuse non-contact cooling water
 - Use where higher temperature is acceptable
 - Warm up incoming water with heat exchanger
 - Chemical make-up
- Examine batch washing and cleaning procedures



FRESH WATER REDUCTION

- Areas of possible reduction
 - Chemical post-dilution
 - Wash-up hoses
 - Vacuum pumps
 - Showers
 - Pump seals and packing

IMPACTS OF WATER SYSTEM CLOSURE



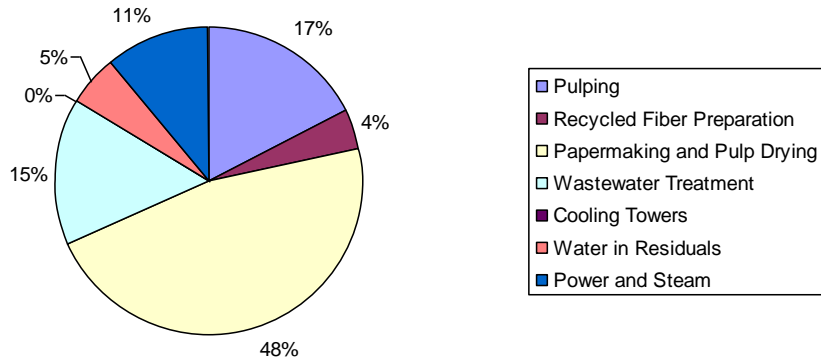
- Microbiological activity
- Corrosion
- Deposit Control – dirt, stickies, scale
- Cleaning shower plugging
- Foaming
- Retention/drainage – increased fines

TAPPI WATER CONSUMPTION TARGETS

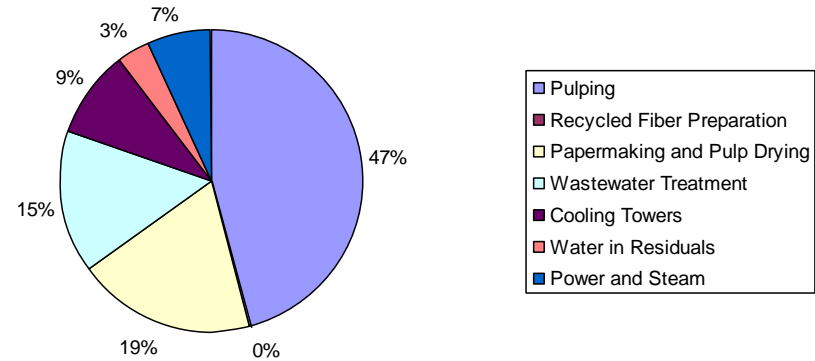
- Pulp <1,000 gal/gross ton
- Paperboard <1,000 gal/gross ton
- Linerboard <1,500 gal/gross ton
- Corrugating Medium <1,500 gal/gross ton
- Kraft paper <1,500 gal/gross ton
- Fine paper <2,000 gal/gross ton
- Newsprint <2,000 gal/gross ton
- Bleached board <2,000 gal/gross ton
- LWC <2,000 gal/gross ton

Water Consumption by Mill Type

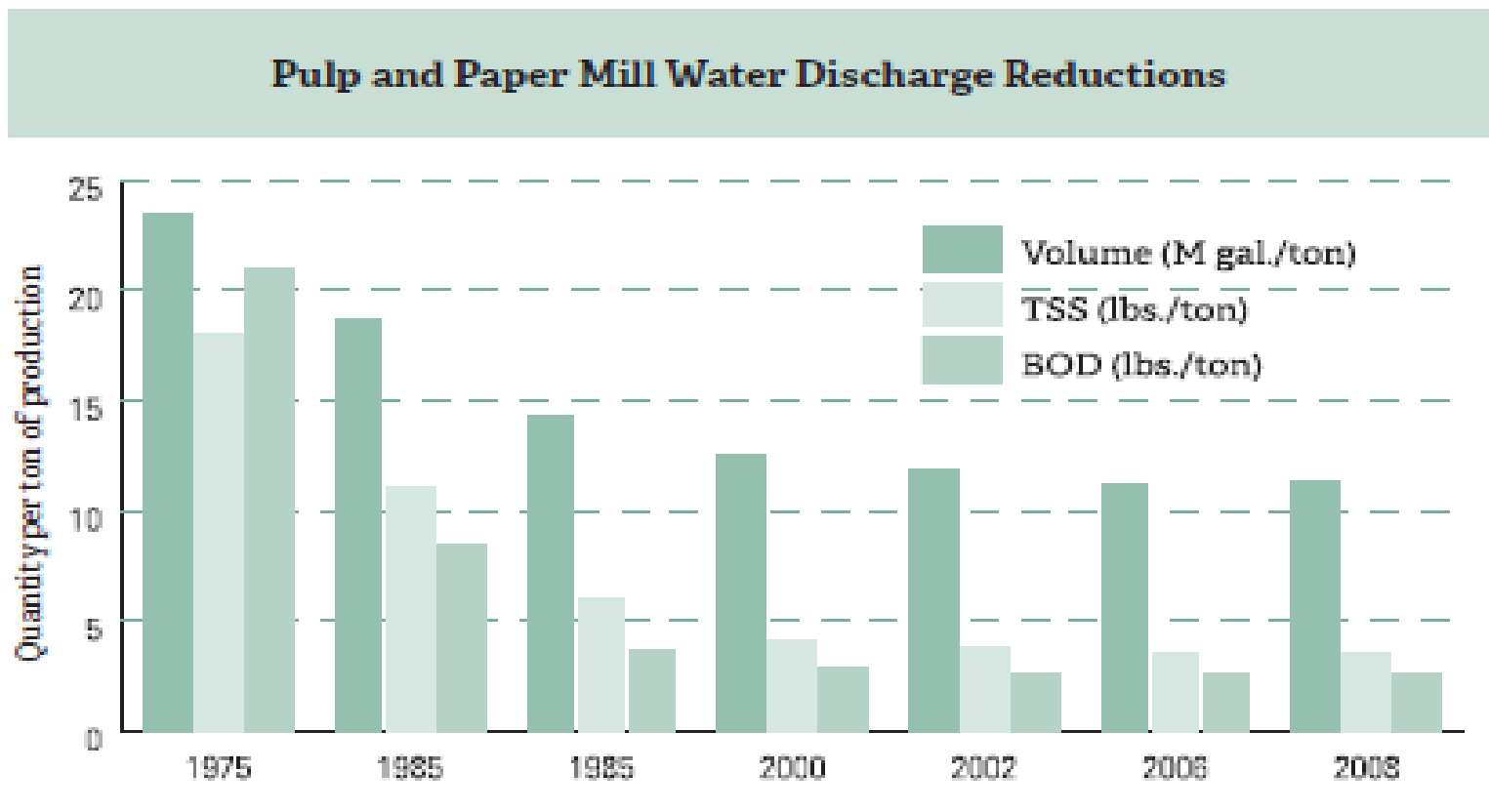
**Water Consumption Mechanical Mills
Percent of Total Consumption**



**Water Consumption Kraft Mills
Percent of Total Consumption**



Historical Water Withdrawal/Discharge Trends



Source: 2010 AF&PA Sustainability Report



WATER USE GOALS

- Reduce
- Reuse
- Recycle