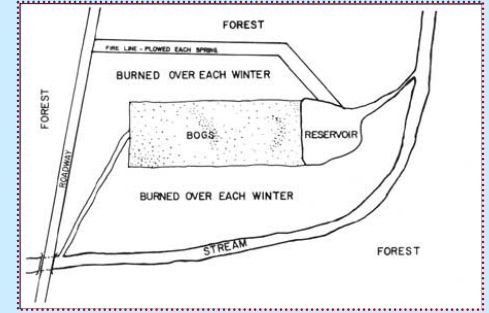
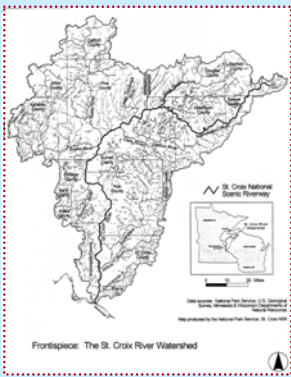


Cranberries on the Croix

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Process of Cranberry Production:

After selecting a site with acidic soil and plenty of sand and water, farmers must clear the land of all trees and vegetation, leveling the land below the level of the water table. Extra soil is used to create ditches and dikes to regulate water flow in and around the bog. Farmers then spread cuttings of previous years' cranberry crops over the cleared area and water them. During the growing season, farmers may use a combination of fertilizers, herbicides, and insecticides to maximize yield and protect crops from pests. When the time comes to harvest the cranberries, farmers use either dry-harvesting, wet-raking, or beating.

State and National Policies on the St. Croix:

Legislation:

- ❖ Swampbuster Provision of the food Security Act of 1985
- ❖ Section 404 of the Clean Water Act

Agencies and Partnerships:

- ❖ Lower St. Croix Management Position
- ❖ St. Croix river Interagency Water Resources Planning Team
- ❖ Protecting Water Quality

Main players in partnerships:

- ❖ MN Department of Natural Resources
- ❖ WI Department of Natural Resources
- ❖ National Park Service
- ❖ U.S. Geological Survey
- ❖ Boundary Commission

The cranberry industry is growing. Wisconsin is the lead producer in the U.S. and many farms are located adjacent to the Saint Croix.

State	Production Barrels (2005)
WA	187,000
OR	440,000
NJ	533,000
MA	1,405,000
WI	3,660,000
Total in U.S.	6,225,000

*Cranberry production chart: http://191.121.3.33/Statistics_by_State/Wisconsin/Publications/Crops/cranprod/ nation.pdf

*Aerial View of Cranberry Farm: http://www.nps.gov/history/online_books/n3/imagery/1c42.jpg

*Map of Saint Croix: http://www.nps.gov/archives/sacrnhs/fig1.jpg

Effects of Cranberry Bogs on St. Croix Water & Soil

Background: Cranberry bogs along the St., Croix river are the source of many environmental disturbances that directly effect the hydrological cycle, surface water quality, bed sediments, and ground water. These environmental disturbances are caused by the processes involved in cranberry farming such as irrigation for flooding the fields, drainage for harvesting, fertilizers, pesticides, and herbicides used in the spring and summer.

Pesticides Seep Into Groundwater and Drinking Water :

❖ Although there is great variation in the levels of chemicals found in drinking water there have been several cases of concern along the St. Croix River where measured concentrations of 2,4-D (pesticide used in cranberry farming) fell below drinking water standards.

Effects of Nitrogen and Phosphorous:

❖ Nitrogen and Phosphorous used in cranberry farming cause large algal blooms to occur downstream in slow waters.
❖ A difficult aspects of connecting Nitrogen and Phosphorous problems with algal blooms is that the blooms often occur miles away from where the Phosphorous and Nitrogen source.

Effects of Chemicals in Soil:

❖ Insecticides sink down to the bed sediment and will stay there (sticking to fine sediments) accumulating in pools which in turn may promote excessive plant growth and decreased levels of oxygen for organisms in benthic zone.

Effects of Norflurazon in Surface Water:

❖ Norflurazon is one of the most commonly detected pesticides found in waterways adjacent to the St. Croix from cranberry farming.
❖ Norflurazon is applied during the Spring to control weeds and will stay in soil for more than 130 days or in water for more than 2650 days.
❖ This residual pesticide's chronic toxicity on plants and animals have yet to be studied in depth.

Commercial Cranberry Farming Is Detrimental to Area Flora:

- ❖ Dam and reservoir construction alter ecosystem temperatures and flooding patterns.
- ❖ Excessive application of herbicide to cranberry bogs results in soil erosion and loss of ecosystem function (wildlife species lack food supply and vegetation isn't there to provide natural filtering).

Human Welfare

Benefits:

- ❖ Farming activities and scenery are considered aesthetically pleasing
- ❖ Cranberry industry is profitable
- ❖ Cranberries have omega 3, 6, and 9 fatty acids and antioxidants, making them a healthy fruit.

Drawbacks:

- ❖ Loss of ecosystem services (provisionary, recreational, supporting, and regulatory)
- ❖ Exposure to chemicals during application
- ❖ Loss of organic food sources (bio accumulation of chemicals)



"Reduced species richness has been cited as a consequence of herbicide treatment"

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