

Effect of 2011 Flood on Trees

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Jackson Bird
City Forester

- The number one question asked is “How long will trees tolerate flooding?”
- The difficulty to this question is fully understanding the impact of the flood to the soil, tree and understanding the characteristics of the flood itself

Tree Tolerance to Flooding

- Flooding during growing season vs. dormant period
- Duration of flood
- Flood keeps soils saturated
- Flood stress symptoms
 - Leaf chlorosis
 - Defoliation
 - Reduced leaf size
 - Crown dieback
 - Early fall coloration and leaf drop

Flooding and Stress Symptoms

- Flooding reduces the supply of oxygen to the roots
- High concentrations of toxic compounds
- Currents of flood can erode soil away or deposit soil over root system
- Changes to the pH of the soil

Effects of Flooding on Soils

- Many species of trees can survive months of flooding
- Mature tree vs. young and over-mature trees
- Long term flooding can lead to death and decay of root system
- Health and vigor of tree before flooding

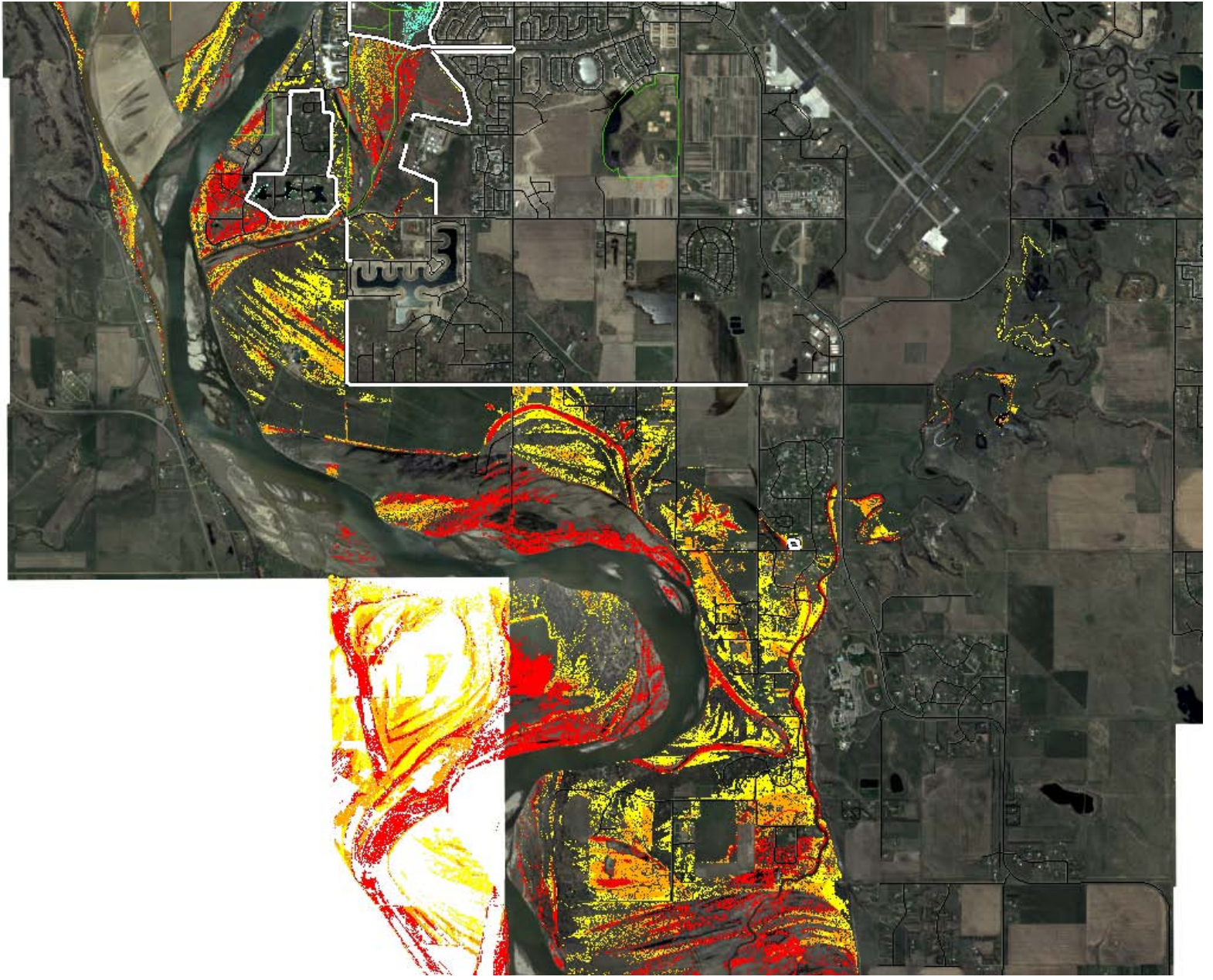
Effects of Flooding on Trees

- Season of the flood
- Duration of the flood – some species can withstand 1-4 months of water over the soil
- Water level
- Temperature and oxygen
- Chemicals

Characteristic of Flood

- Water levels started to come up in mid to late May
- Flood levels expected to stay high into August
- Trees in active growing season
- Many spots water is standing
- Many non-native species in flood area
- Secondary insect and disease issues
- Tree Toppling

2011 Bismarck Flood Event



- Enhance the vigor of trees by the end of the current or most immediate growing season
- Assessment of tree survival and structural hazard conditions
- Aerating the soil
- Mulching and watering during extended dry periods
- Fertilization a year after
- Prune for safety concerns
- Watch for fungal problems

Managing Flood Stress Trees

- Black ash
- Green ash
- Black willow

Flood Tolerant Species

- Boxelder
- Silver maple
- Hackberry
- Honeylocust
- Eastern cottonwood
- Bur oak
- American elm

Intermediate Flood Tolerance

- Norway maple
- Sugar maple
- Buckeyes
- Russian olive
- Black walnut
- Junipers
- Pines
- Lilacs
- Lindens
- Colorado spruce
- White Spruce
- Siberian elm
- Flowering crabapples
- Cherries, plums, peaches, apricots

Intolerant to Flooding

- Understanding the Effects of Flooding on Trees – Iowa State University, University Extension – 2008
- Flooding and its effects on Trees – USDA Forest Service
- Effects of flooding on woody landscape plants – University of Wisconsin, UW Extension – 2008
- Flood damage to trees – University of Georgia, College of Agricultural & Environmental Sciences – 2010
- Presentation from Dr. John Ball, SDSU - 2011

Sources